

*Royal Commission  
on Canada's Economic Prospects*

*Progress and Prospects  
of  
Canadian Agriculture*

*by W. M. Drummond and W. Mackenzie*



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ROYAL COMMISSION ON CANADA'S ECONOMIC PROSPECTS

**PROGRESS AND PROSPECTS**  
**OF**  
**CANADIAN AGRICULTURE**

JANUARY, 1957

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## **PREFATORY NOTE**

The authors whose names appear on the title page, Dr. W. M. Drummond of the Ontario Agricultural College, and Mr. Wm. MacKenzie of the University of Alberta, shared the major responsibility for this study. However, several others were associated with them in this work for various periods of time.

Special acknowledgement must be made of the contribution of Mr. J. B. Rutherford, whose services were lent to the Commission by the Department of Fisheries. Mr. Rutherford contributed substantially to the analysis of domestic demand and requirements for Canadian farm products and to the study of technological developments; and prepared Chapter 13 on Farm Incomes and the technical appendices A, C and E.

The services of Dr. E. C. Hope were generously lent to us for a few months by the Canadian Federation of Agriculture. He contributed a statistical analysis of the structure of farm capital and prepared the text of Chapter 6 (Farm Credit). We were fortunate in being able to borrow the services of Dr. W. E. Haviland of Macdonald College, who prepared the chapter on Quebec agriculture in collaboration with Dr. Charles Lemelin of Laval University. During the preparation of the study these individuals also made contributions in a consultative capacity. To all these contributors, as well as to the institutions who made their services available, the Commission is very grateful.

D. V. LEPAN

Director of Research





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## INTRODUCTION

IN THIS study of agriculture we have attempted to determine and describe the way in which the agricultural industry in Canada will develop during the next 25 years. The report on the study falls into four parts. Part I deals with the changing structure of the agricultural industry. In Part II we include a number of studies which are designed to bring out regional differences. Part III is concerned with marketing and farm incomes. The final Part, Chapter 14, consists of a discussion of problems which will perhaps persist, but for which it may be hoped some workable solutions can be found.

We have studied agriculture as an industry, in terms of the kind of considerations relevant to other industries, at the same time recognizing that, as an industry, agriculture has some unusual characteristics. We have thought of the farm as a business organization designed to produce for the market. Market criteria and market forces will be the principal determinants of the future trends. We are aware that governments in all or most countries have shown a particular solicitude for agriculture. There is no easy proof that these measures have materially deflected the impact of technology and other forces operating through the market on the structure of the industry. Many of the persistent trends are those against which government policy has apparently been directed. We would expect governments in Canada to continue to demonstrate a concern for the welfare of agriculture. At some points in the report of our studies we call attention to what seems to us to be the danger of overstimulation of production which might result from government action. In discussing the future problems of the industry we refer to means, involving government participation, which might serve to reduce the problems. However, in our attempt to interpret the future we have assumed that government action will not over the next 25 years constitute a major factor determining the changes which will occur.

It may be that history never repeats itself and that historical trends provide no sure foundation for predicting future changes. We do not subscribe to any mechanistic interpretation of social and economic processes. However, the view of the future can be illuminated by a study of recent trends. The situation is not static at any time. It is likely to include dynamic elements whose effects were felt in the recent past and which have not yet



run their course. Investigation of recent trends should then be part of an inquiry designed to throw light on the future. Chapter 1, "Recent Changes in the Structure of Canadian Agriculture", sets out some of the significant changes which can be identified in the recent statistical record. The chapter may serve the additional purpose of giving a brief description of Canadian agriculture today, that is, of the point of departure in the journey from 1955 to 1980.

Future changes in the structure of agriculture will be initiated by dynamic elements either within agriculture or bearing on it from outside. The main internal element will be the enterprise of producers and their capacity and ability to adjust and respond to the forces affecting the industry. A second dynamic element is both internal and external. This is the growth of technical knowledge and the application of knowledge to production processes on the farm. Much of the advance in technology results from experimentation and research carried out by agencies set up and supported for the purpose. But practising farmers are often initiators of new methods, and effective application of new techniques is impossible without participation by producers. A third dynamic factor, the demand for farm products, is almost wholly external to agriculture, but it creates conditions to which producers must adjust.

In the report we have not set aside a particular chapter on the capacity and enterprise of Canadian farmers. However, reference is made to this factor at appropriate points, and throughout the whole report there is evidence of implicit confidence in the ability of producers to meet the demands upon them, provided adequate incentives are present.

In Chapter 2 we turn directly to the external factor which will provide the dynamic for growth and change, namely, the demand for farm products. Particular attention is given to the prospective growth of domestic demand. Because of the comparative stability of food consuming habits, revealed in fairly clear regularities in relations among numbers of consumers (as expressed in relatively constant volume of food consumption per person) and because of a reasonable stability in the spending of incomes (exhibited in the apportioning of income spending upon particular commodities and services), the measurement of prospective changes in food requirements can be undertaken with a relative degree of confidence. The prospects for effective export demand, influenced as they are by the more intangible and uncertain factors which enter into trade relations, are more obscure. We have attempted a forecast, within limits, of exports of wheat. No precise prediction of the level of exports of other farm commodities is attempted. In view of the marked uncertainty of this element in total demand, we suggest that it seems wisest to assume that no significant increase will occur, although we point out later in the report the modifications to other conclusions which would be required should a substantial increase in export demand for a variety of products actually occur. In the past, export de-

mand, principally for wheat, has proved a major dynamic contributing to agricultural expansion in Canada. Our study of all the factors involved leads us to the conclusion that, in the period lying ahead, the principal dynamic element within total demand will result from the growth of domestic non-farm industry, population and incomes.

Having considered the probable growth of demand, we turn to look at the capacity of our land resources to contribute to increased output. Pressure to increase output does not fall on land resources alone. Capacity to produce involves as well techniques of production and the use of other factors along with land. However, the ease or difficulty with which expansion can be effected, given the developing techniques of production, depends upon the characteristics of the land factor. Chapter 3 deals with this aspect of the problem. The principal conclusion presented in this chapter — that market requirements can probably be met without a substantial increase in land in farms — is dependent on our view of technological developments, which is the subject of Chapter 4. The completion of the settlement of the Prairie region marked the end of a period in the expansion of agriculture in Canada. Further lateral expansion involves the utilization of lands with very different and generally less favourable features. This is one of the reasons why we conclude that, in the period ahead, increased output will be achieved primarily by utilization of land in greater depth, that is, by more intensive use of land in areas already settled.

In Chapter 4 we turn to the discussion of technological changes. Particular changes in techniques are highly unpredictable, and the rate of technological advance, as it bears upon any industry, varies from time to time. However, the rate at which agriculture has recently been responding to the growth of scientific knowledge is impressive, and we believe that this growth will proceed at an accelerated rate. Experience, too, provides convincing evidence that, when particular difficulties occur and an urgent need becomes apparent, a concerted research effort to provide answers is likely to lead to the removal of the impediments to production. In Chapter 4 we describe the rates of increase which have occurred in input-output relations in agriculture and conclude that similar rates of advance are consistent with the conclusions reached regarding the use of our land resources.

Chapter 5 outlines the changes which we expect will occur in the structure of agriculture over the next 25 years, consistent with our interpretation of changes in demand, techniques, and land use. We stress the difference between the shorter period up to 1965 or 1970, and the period beyond, 1970 to 1980. The shorter run changes are more affected by the trends inherent in the situation today. Predictions respecting the next 10 to 15 years can be approached with greater confidence. In the longer run, factors wholly unforeseeable at this time may emerge to affect significantly the directions of change. The absolute magnitudes expected in 1980 are

offered subject to a wide margin of error; but we trust that our analysis points to the main directions of change and to the new balance which will characterize the period ahead.

The changes to be expected suggest a continuous and substantial process of adjustment. If our view of the growth of demand is correct the problems of adjustment should not be too great. It is easier to go forward than to retreat. Concern for facilitating adjustments leads to consideration of arrangements for agricultural credit. Adequate arrangements for the provision of credit can be important to the perpetuation of the family farm as an efficient producing unit. Chapter 6 deals with agricultural credit.

Chapters 1 to 6 complete the first part of the report on agriculture. In these chapters we have presented an analysis of the general trends in Canadian agriculture which may be expected to develop in the future. However, Canada is a country of widely dispersed and differing geographic regions. Moreover, although developing within the framework of Confederation, each of the regions has its own historical origin. The structure of agriculture in each region reflects the interplay of historical and geographic forces. It is not surprising, therefore, that significant differences in the characteristics of agriculture can be observed among the regions. While general forces affecting the economy as a whole will shape the future in all regions, divergences from the general trends will occur in particular parts of the country. A considered effort has been made to reconcile the sum of the views in the regional studies with the general or aggregate trends expected for Canadian agriculture, and there does not seem to be any significant inconsistency. The changes in the regions will occur within the general framework of changes. The purpose of the regional studies is to bring out the differences in agricultural development which may be expected in the several regions. It will be apparent that in some instances general problems of agriculture are of more significance in certain regions than in others. The discussion of problems in the concluding chapter is designed, where necessary, to disclose these regional differences.

Part III of the report includes two chapters, one on marketing and the other on farm incomes. The chapter on marketing is clearly not designed to provide a complete treatment. Within the 50-odd years from the beginning of the great expansion of Canadian agriculture, marketing arrangements have undergone a substantial evolution. A review of the changes which have occurred is suggestive of the trends which may characterize the next 25 years, and developments in marketing methods may have significant effects on farm incomes and income problems of agriculture.

Chapter 13 presents an analysis of farm incomes. The basic data required for a thorough analysis of farm incomes are not available. However, we have attempted to distinguish the incomes received from agricultural activities by families living on residential and part-time farms.



and the incomes of producers engaged in full-time commercial agriculture, that is, the incomes of families wholly or almost completely dependent on production for the market. This differentiation is essential to a proper appreciation of the levels of income obtained from farm production and of the income problems of farm producers. The particular income problems of the part-time and commercial farm are referred to in the concluding chapter.

We conclude the report, in Chapter 14, with a discussion of problems affecting the industry. This chapter deals, first, with production problems and, second, with income problems. The production problems referred to are those which appear significant from the analysis of future trends and conditions. They include problems of land use, investment and techniques. The income problems are those, such as low levels of incomes and irregularity of incomes, which have been apparent in the past and are likely to persist. We point to various means which might prove effective in reducing the magnitude of the problems. We conclude with a reference to problems some of which will prove intractable. Other industries may expand more rapidly, and, 25 years from now, the agricultural industry in terms of certain criteria may not be as big a part of the total economy as it has been in the past. However, it will be apparent throughout the report that the view of the prospects of Canadian agriculture which we have obtained from our study is essentially an optimistic one. All the dynamic factors point to a period of growth and development and to shifts in production which will lend greater stability to the industry. While agriculture will have its ups and downs, over the long period the forces are favourable to higher and more stable farm incomes. In this setting, it would appear that the activities of governments in relation to the industry should facilitate rather than direct; remain flexible, to meet short-run difficulties, without introducing permanent rigidities; and display the wisdom to avoid doing those things which should not be done, as well as to stand ready to promote the welfare of the large number of Canadians who will remain dependent on agricultural production.

Some parts of the analysis — for example, the measurement of the prospective domestic requirements for farm products and the measurement of rates of change in input-output relations — have involved the use of more elaborate statistical procedures. The manner in which estimates have been arrived at will be of more interest to some than to others. We have therefore included at the end of the report technical appendices outlining the methods followed. While we have been greatly aided by the co-operation of the government agencies concerned with agricultural statistics, another time-consuming part of the study has been the assembling and processing of the basic statistical data for the particular purposes of our investigation. Where we believe more detailed statistics than those required in the text would be of interest and value, we have included these in statistical appendices.





**PART I**

**THE STRUCTURE OF CANADIAN AGRICULTURE**



## **RECENT CHANGES IN THE STRUCTURE OF CANADIAN AGRICULTURE**

### ***I. Introduction***

The agricultural industry in Canada is made up of just under 600,000 producing units varying greatly in size and organization. When changes in the output of the industry and in its organization are treated in a general way, the result can be rather misleading. A general review of the changes over the last 25 years is, nevertheless, a useful beginning for a consideration of the prospects of the industry in the next 25 years. It can help in two ways: it can provide a picture of agriculture as it is today for those who are not familiar with the present structure; and, in producing this general picture, it can develop trends to show how the existing organization came into being. These trends will be of great help in considering prospects for the industry. Estimates of future changes can be produced only by considering at what rate changes now occurring will continue, whether they will stop altogether, or whether they will become more pronounced as the years go by. It is with this dual purpose in mind that we begin this report with a review of changes in the output and organization of agriculture.

It does not necessarily follow that, because the period over which future prospects are being forecast is 25 years, the period over which past developments are considered should also be 25 years. A somewhat longer period might, in some instances, prove more valuable in judging certain trends. It so happens, however, that in Canadian agriculture the last 25 years constitute a more suitable period to review than any more lengthy period. This is so because, by 1930, most of the large-scale efforts to settle agricultural areas of Canada had been made, and the period since that date is more likely to contain within it some of the influences on



agricultural structure which may help to determine future changes. The approach to this study is, first, to make estimates of the demand for food to be produced by Canadian agriculture and, second, to consider what changes will be required in the amount of the resources used in agricultural production and what changes will result in the organization of farms. It seems worthwhile, therefore, to consider the recent structure of Canadian agriculture in these terms. It is a matter of logical convenience that we turn first to a consideration of the volume of agricultural output and its composition, and then to an examination of some of the changes which have taken place in the organization of Canadian farms.

## *II. Agricultural Output*

### *1. Volume and Nature of Output*

It is not easy to find a satisfactory measure of the total increase in the volume of agricultural output over the last 25 years. Output fluctuates violently from year to year because of the uncontrollable nature of production. Variations in the yield of wheat per acre have been the major cause of these fluctuations. Wheat yields are highly susceptible to variations in growing conditions, and wheat is produced almost entirely in the Prairie region, where climatic conditions can vary considerably. In addition to this, all agricultural output, being the product of growing plants and animals, is subject to variability arising from unexpected outbreaks of crop and plant diseases.

Even though the fluctuations have been both violent and unpredictable, it is still safe to say that agricultural output has increased substantially in volume. The official index of the physical volume of agricultural production has been available only since 1935. It indicates an increase of 49% in output between the average of the years 1935-39 and that of 1951-55. Two modifications of this are necessary. The first is required because, within the five years 1951-55, there were four exceedingly good crops of grain owing to extremely favourable growing conditions. Perhaps a better comparison is made if the average of the years 1947-55 is used. This period of nine years includes all the postwar years except 1946 and covers a period in which wartime controls over agricultural prices or volume of production of particular commodities no longer applied. The difference in output between the average of these nine years and the 1935-39 period is 38.5%. Even this may err a little on the high side because the level of production between 1935 and 1939 was influenced unfavourably by both economic and climatic conditions. As a rough measure of how important this is we may consider the relationship between the constant dollar value of farm cash income in the average of the 1926-30 period and that in the

average of the 1935-39 period. This indicates that output in 1926-30 was probably 4% higher than in the 1935-39 period, which would suggest a net increase in the volume of agricultural output over the last 25 years of about one-third. There was, in fact, little change in the volume of output for ten years, and then, from 1940, output rose rapidly. None of these measures is very precise, but it seems safe to suggest that output has increased by about 30% to 40% in the last 25 years.

As output has increased in volume some changes have taken place in the pattern of production. Despite the growth in total agricultural output, there has been no continuous and concerted effort to increase the output of wheat. In the 1926-30 period the average acreage in wheat was 23 million acres, and in the 1951-55 period it was 24.5 million acres. There is little indication of any persistent upward trend in the intervening period. The importance of livestock production in the agricultural economy is increasing, although clear measures of the rate at which this is occurring are not easily presented because much of the production of livestock comes in cycles of varying length.

In a period as short as 25 years these cycles make it difficult to discuss any underlying trend. However, allowing for differences in the position in the cycle of production, the difference in the output of meats between the five years 1926-30 and those of 1951-55 is sufficient to suggest that this form of production is proportionately greater than it was 25 years ago. Beef production was 69% higher, pork production was 69% higher, and poultry-meat production, which has gained greatly in volume in recent years, was 280% higher. Wheat production in the same period increased by 24%, and much of this increase was the result of the extremely high average yield in the 1951-55 period. Oat production rose by only 6% over the 25 years, reflecting in part the release for livestock feeding of a considerable volume of oats which was previously required to maintain working horses. Barley production rose by 130%, but the utilization of barley as feed rose 75%, so that a considerable part of the increase has been used for livestock production.

Changes in the source of farm income do not reflect this gradual shift as well as might be expected. There are two reasons why this is so. One is that grain prices and grain production fluctuate more than livestock prices and livestock production. The other reason, which is directly related to the first, is that the last 25 years contained both a severe depression and a major war, which produced unusual movements in both the production and prices of livestock and grain. The data included in Table 1 show that products of animal origin have tended to rise in price relative to those of field crops.

Table 1

## INDEX NUMBERS OF WHOLESALE PRICES OF FARM PRODUCTS

(1935-39 = 100)

	Field products	Animal products	Animal products ÷ field products
1926-30.....	137	135	99
1931-35.....	72	83	115
1936-40.....	100	103	103
1941-45.....	127	153	120
1946-50.....	154	238	126
1951-55.....	187	276	147

SOURCE: *Prices and Price Indexes*, D.B.S., and *The Economic Annalist*, Department of Agriculture.

Within each group of field and animal products there have been shifts in the short-term relationship between individual product prices. It is not safe, therefore, to assume that shifts in the proportion of farm cash income coming from a particular crop or product are the result of shifts away from, or toward, that product. Nevertheless, keeping the data in Table 1 in mind, some general indications of the relative importance of certain products in agricultural production can be obtained by examining Table 2.

In the period since 1941 there has been a tendency for livestock to be the most important source of income for the Canadian farmer. Wheat has become of lesser importance, partly because the quantity which is produced is altering slowly, if at all (except in the recent period of extremely high yields), and partly because the price of wheat is declining relative to that of other farm products. Wheat is being produced in the same volume, but fewer people are now required to produce it, and so for those who remain it is still a profitable crop. Grains other than wheat have shown some indication of becoming relatively more important. As all grain prices tend to move together, an increasing share of cash income from other grains suggests an increase in the volume sold. This has been the case, particularly in the last five years, when exports of coarse grains have been high. Whereas in 1926-30 income from wheat sales was 70% of all the farm cash income from grain, it was under 50% in the war and early postwar years, and even at the high level of sales of the last five years it has not reached more than 58%.

The broad trends indicated by the figures are that a combination of price movements and changes in the relative emphasis on particular products has made crops less important as a source of farm income and that the cash income from livestock and livestock products has increased slightly in proportion. In the first of these broad categories, there is a distinct trend toward increasing stress on coarse grains and other crops relative to wheat;

Table 2

PERCENTAGE COMPOSITION OF FARM CASH INCOME IN CANADIAN AGRICULTURE  
(five-year averages from 1926-30 to 1951-55)

	Wheat <sup>a</sup>	Other grains <sup>b</sup>	Other crops	Total crops	Livestock	Dairy products	Poultry and poultry products	Total livestock and livestock products	Other <sup>c</sup>	Total
1926-30, . . . . .	37.8	6.8	9.1	53.7	21.1	12.8	8.6	42.5	3.8	100.0
1931-35, . . . . .	26.4	4.2	12.8	43.4	21.8	20.4	9.6	51.8	4.8	100.0
1936-40, . . . . .	25.9	4.7	13.1	43.7	26.3	17.0	7.8	51.1	5.2	100.0
1941-45, . . . . .	19.4	8.1	11.7	39.2	30.2	16.4	8.0	54.5	6.2	100.0
1946-50, . . . . .	22.2	7.8	11.7	41.7	30.0	15.3	7.9	53.2	5.1	100.0
1951-55, . . . . .	22.7	9.4	6.7	38.8	27.6	15.6	9.9	53.1	8.1	100.0

<sup>a</sup> Wheat includes Wheat Board Payments 1944-55.

<sup>b</sup> Other grains includes Wheat Board Payments 1944-55.

<sup>c</sup> Other includes fruit, wool, honey, maple products, miscellaneous farm products, fur farming, forest products sold off farms, and payments under Prairie Farm Assistance Act.

SOURCE: D.B.S. Reference Paper 25, Pt. II.

D.B.S., memorandum, *Farm Cash Income Series 1953-56*.



and, in the second, some suggestion that livestock and poultry are becoming greater sources of income and that dairy products are not increasing in price or quantity at the same rate.

As agricultural output has risen, the domestic market has become of greater importance to the agricultural producer. In recent years this fact has been hidden by the rapid increase in the export of coarse grains, and a generally high level of grain production and export. Although the proportion of agricultural output exported was 21% in the average of the 1951-55 period and 20% in that of 1935-39, there has been a recent change in the composition of exports. It is clear from Table 3 that, if the export of coarse grains had not been at an extremely high level in the years 1951-55, the proportion of output exported would have fallen. As it was, livestock exports were reduced substantially. The production of oilseeds and oilseed products, forage crop seeds and tobacco has risen in physical volume, and the rising proportion of these crops exported has produced an increase in the proportion which crops other than grain make of the total export of agricultural products.

Table 3

### PERCENTAGE COMPOSITION OF AGRICULTURAL EXPORTS BY VALUE

*(average of 1935-39 and 1951-55)*

Kind of export	Percentage of exports	
	1935-39	1951-55
Wheat.....	45	47
Coarse grains.....	4	16
Other crops.....	4	6
Apples.....	3	1
Livestock and livestock products.....	28	14
Other.....	16	16
Total.....	100	100

N.B. Comparable data for the period 1926-30 are not available.

SOURCE: Compiled from *Trade of Canada Exports* by the Economics Division of the Marketing Service, Canada Department of Agriculture.

The importance of the domestic market to the livestock producer is shown in the data in Table 4. In the last five years the domestic market has been absorbing all of the increase in the production of livestock products which has come about over the last 25 years. Domestic consumption of meats was held down during the war because of a pressure to export under contract to the United Kingdom. Since then, however, increases in the per capita consumption of meat products have taken place and these, along with the increase in population, have accounted for the increased domestic disappearance. In the 25 years covered by this table population has increased by 50%.



Table 4

# PRODUCTION AND DISPOSITION OF THE MAJOR AGRICULTURAL COMMODITIES

(average of 1926-30 and 1951-55)

	Production		Domestic disappearance		Net exports	
	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55
Wheat (million bushels).....	437	527	121	141	296	300
Oats " ".....	396	413	384	360	6	53
Barley " ".....	140	246	84	127	14	76
Poultry (million pounds).....	105	400	100	405	5	0.4
Pork " ".....	589	994	545	879	46	43
Beef " ".....	535	943	505	897	32	32
Butter " ".....	269	318	281	308	-12	—
Cheese " ".....	150	90	33	80	117	12
Eggs (million dozens).....	253	388	254	341	-5	—

SOURCE: Compiled from D.B.S., memoranda on grains, livestock, dairy products and eggs.

The changes over the last 25 years illustrate the effects of the depression first of all, and then the unusual changes of wartime. In a comparison of the postwar period with the 1926-30 period, two significant changes appear. There seems, first of all, to be a change in emphasis toward livestock and livestock products as output increases, and second, an increase in the dependence on the domestic market as the population of Canada grows and people demand more meat, eggs and dairy products. The evidence is hardly sufficient to indicate trends which have been persistent enough to be called long-term, but they are suggestive of a change in the future direction of output. Despite the maintenance of the proportion of output being exported recently, there is some indication that unless export markets for coarse grains can be held at recent levels the domestic market will absorb a greater part of the total product. There seems to be little doubt in any event that this will be the case for livestock and livestock products.

## 2. Regional Specialization in Production

In addition to these changes in the direction and amount of output, there have been some slight changes which are of some importance within the regions of Canada. These are shown in Table 5. There was an increase in output in relative terms in Quebec. The share of the Canadian farm cash income originating in Quebec rose from 11% to 16%.<sup>1</sup> This is compatible with an increase in the amount of commercial farming in that province. Ontario, which has only 12% of the land in farms in Canada,

<sup>1</sup> By five-year intervals the share is 1926-30, 11%; 1931-35, 14%; 1936-40, 14%; 1941-45, 14%; 1946-51, 14.8%; 1951-55, 15.8%.

Table 5

## PERCENTAGE OF CASH INCOME FROM MAJOR PRODUCTS ORIGINATING IN REGIONS

(1926-30 and 1951-55)

	Maritimes		Quebec		Ontario		Prairies		British Columbia	
	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55
Grains.....	..	..	1	..	5	3	93	96	..	..
Livestock.....	4	4	13	17	49	37	32	39	2	3
Dairy products.....	7	7	28	36	44	34	18	18	3	5
Poultry.....	5	7	13	18	46	44	25	22	11	9
Fruit and vegetables.....	12	5	13	16	44	53	2	4	29	22
Potatoes.....	37	38	28	18	25	34	4	4	6	6
Sugar beets.....	nil	nil	..	8	83	28	17	64	nil	nil
Tobacco.....	nil	nil	18	5	82	94	nil	nil	nil	1
All products.....	4	4	11	16	27	28	54	48	3	4

.. Indicates less than 1%.

SOURCE: D.B.S. Reference Paper 25, Pt. II.  
D.B.S., *Farm Cash Income Series 1951-55*.

has increased output at a rate great enough to maintain a share of about 28% of the total Canadian product. The Prairie region produces nearly half the value of all products sold off farms in Canada. It is interesting to note that despite the high levels of grain production and sale in the 1951-55 period the rise in livestock prices relative to grain prices has resulted in a slightly declining share of farm cash income going to the Prairie region.<sup>2</sup>

Certain other points are brought out in this table. It will be noted that 96% of the grain sold off farms in Canada is grown in the Prairie region. Agriculture in Ontario produces somewhat more than one-third of the livestock and the dairy products sold in Canada, more than two-fifths of the poultry and eggs, one-third of the potatoes, half of the fruit and vegetables, and almost all of the tobacco. The contrast in the intensity of production between the Prairie region and Ontario is well illustrated in these data. The Province of Quebec now produces more of the dairy products for sale than any other region, having increased output at a faster rate than Ontario. The emphasis in dairying in Ontario is increasingly on the production of milk for the fluid market, while more and more of the milk for processing has been produced in Quebec. The share of poultry and egg production in Quebec has gone up as the result of the use of more Western feed grains brought in under the Freight Assistance Policy. All forms of livestock production have increased in relative importance in Quebec; that province now produces a larger share of the total amount of livestock, poultry and dairy products.

In the Prairie region dairy production has expanded at as fast a rate as elsewhere in Canada, so that the proportion of Canadian sales originating in the prairies is the same now as it was 25 years ago. Livestock production has risen a little faster than it has elsewhere; in the last five years the Prairie region has been the most important source of meat animals. There is a move, which seems to be progressive, toward an even greater concentration of cash grain sales in the Prairie region. In British Columbia the expansion of agriculture has been into land which could not be farmed as intensively as the fruit and vegetable districts which provided the mainstay of the agriculture of that region 25 years ago. An increasing share of livestock and dairy production now comes from the British Columbia region, while there is some tendency for a decreasing share of Canadian vegetable sales to come from there.

The extent to which changes have taken place in the distribution of farm cash income within regions is shown in Table 6. Despite the fact that an increasing share of the grain sold is coming from the Prairie region, there is a notable decline in the importance of grain as a source of cash

<sup>2</sup> Even though surplus grain remains unsold and does not come into this comparison, grain sales in the 1951-55 period have still been high.

Table 6

## PERCENTAGE CONTRIBUTION TO REGIONAL FARM CASH INCOME BY PRODUCTS

*(average of 1926-30 and 1951-55)*

	Maritimes		Quebec		Ontario		Prairies		British Columbia	
	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55	1926-30	1951-55
Grains.....	4	1	5	..	8	3	78	64	4	4
Livestock.....	20	25	24	31	38	37	13	23	12	17
Dairy products.....	20	23	32	36	21	19	4	6	15	25
Poultry.....	10	15	10	11	15	16	4	4	28	20
Fruit and vegetables.....	9	4	4	4	5	7	..	1	29	21
Potatoes.....	19	13	6	2	4	3	..	..	2	2
Sugar beets.....	nil	nil	..	..	1	..	..	1	nil	nil
Tobacco.....	nil	nil	1	..	2	8	nil	nil	nil	nil
Other crops.....	3	2	5	2	3	5	1	1	4	5
Forest products.....	9	17	11	13	3	2	..	..	6	6
Furs.....	6	..	2	1	..	..	..	..	..	..
All products.....	100	100	100	100	100	100	100	100	100	100

.. indicates a percentage smaller than 1.

SOURCE: D.B.S. Reference Paper 25, Pt. II.

D.B.S., *Farm Cash Income Series 1951-55.*

income in that region. It made up more than three-quarters of the income 25 years ago, and now constitutes just under two-thirds. Livestock and dairy products have become more important as sources of income. Thus, although farming on the prairies is still extensive when compared to all other regions, there are distinct signs of some shift toward a more intensive type of farming. In all regions of Canada livestock has become an important source of farm income, partly because prices have been favourable, and partly because of an increase in the volume of output.

### *III. The Organization of the Farm Business*

#### *1. Land Area and Size of Farm*

The area of land occupied for farming in Canada increased by 11 million acres between 1931 and 1951.<sup>3</sup> Between 1941 and 1951 the net effect of changes in land area was an increase of only 0.4 million acres, from 173.6 million in 1941 to 174 million in 1951.<sup>4</sup> Certain shifts in the amount of land occupied for farming took place within regions over the 20 years between 1931 and 1951. In western Canada the area occupied by farms increased, while in eastern Canada it decreased.<sup>5</sup> In the Maritimes the area of land in farms has been declining continuously since 1911; in Ontario it was almost constant until 1941, since when it has declined; and in Quebec it increased slowly to 1941, but has fallen back since then to the 1921 level.

While these changes were taking place, a reorganization of farm businesses was taking effect, bringing about a reduction in the number of farms and an enlargement of the average size of farm. It is not very desirable to consider changes in land area as reflecting changes in the size of farms, especially in Canada, where regional changes are such that the intensity of land use varies widely. A 100-acre farm in Ontario may have a bigger volume of business than a 320-acre farm in Saskatchewan. The variations in the size and organization of farms in all regions of Canada are quite pronounced. In any discussion of farm organization this fact must be kept in mind. Nevertheless, the change in the average acreage per farm is a good measure of the effect of consolidation. Over the last 25 years most of the changes in farm size have occurred in the Prairie region. Farms there were 20% larger on the average in 1951 than in 1931, whereas elsewhere in Canada changes in size were slight. The average size of farm in eastern Canada was 129 acres in 1931 and 132 acres in 1951, whereas in the Prairie region the increase was from 411 acres to 498 acres. Larger farms in the Prairie region have come about more from

<sup>3</sup> Comparison of periods like 1926-30 and 1951-55 are not possible in this respect because data must be drawn from the decennial census.

<sup>4</sup> A full account of changes in the use of land resources is given in Chapter 3.

<sup>5</sup> Eastern Canada is taken as all provinces east of Manitoba and western Canada as all provinces west of Ontario.



consolidation of existing farms than from additions to land area. Since the West was first settled, there has been a constant growth in the number of acres per farm as homesteads were consolidated into units of production large enough to yield a satisfactory income. The process of consolidation has been taking place in eastern Canada also, but it has been much less pronounced. Farms in Ontario increased in size, but, in the Maritimes and Quebec, farm size has remained relatively constant.

The reorganization into larger farm units brought about a more efficient use of labour and capital, but the process of consolidation only reduced the number of farms by 12%, and this hardly seems sufficient to account for the rise in production of between 30% and 40%. In addition to the reorganization of farm boundaries producing larger and more efficient farms, other changes must have been taking place to increase the volume of output.

An examination of the data which are available shows that two changes of great significance took place. The first was an increase in the application of capital to a slowly increasing land area. This increase in capital has taken the form of additional machines and larger inventories of producing livestock. Technological processes have also been used more widely to increase productivity per acre and per animal. The re-allocation of resources which came about as a result is worth describing in some detail.

The adjustment of agricultural production to the use of mechanical power and to the application of new techniques of production has been of very recent origin. It has taken place with an astonishing rapidity, which is surprising in view of the fact that resources in agriculture are thought to be rather immobile. The mechanization of agriculture and the application of improved techniques of production not only increased the volume of output, but they also brought about a reduction in the labour force to 70% of the prewar level. A rise in output of 30-40% could not have taken place without an increase in labour employment if the mechanical revolution of the last 15 years had not been occurring at the same time. In Table 7 some of the relative changes which have come about in the process of adaptation are shown.

The trend in these index numbers illustrates the process. There is, first, a measure of the increase in size of farm unit as the number of farms decreased. (The total land area in farms remained almost constant after 1941.) Second, a productivity increase of 25% per acre and 44% per farm has come about since 1941. This can only have arisen from better cultivation practices and higher output per animal on farms through the application of better techniques during these years.<sup>6</sup>

<sup>6</sup> To find a measure of productivity per farm and per acre the same procedure was followed as for a measure of the increased volume of total output which is described in the first part of this chapter. The figure used in the 1955 index is the result of averaging the product in the years 1947-55.

In the process of increasing the volume of output there was a considerable reorganization of the factors of production. These changes can be studied in the bottom part of Table 7. There has been a very large

Table 7

## RELATIVE CHANGES IN CERTAIN ASPECTS OF AGRICULTURAL ORGANIZATION

(based on 1941 = 100)

	1931	1936	1941	1946	1951	1955
Farm size <sup>a</sup> .....	94	96	100	105	110	115
Number of farms <sup>a</sup> .....	99	99	100	91	91	88
Production per farm <sup>b</sup> .....	n.a.	78	100	120	..	144
Production per acre <sup>c</sup> .....	n.a.	91	100	114	..	125
Use of factors of production per farm						
Labour <sup>d</sup> .....	100	n.a.	100	108	91	82
Horses <sup>e</sup> .....	112	105	100	83	51	35
Machinery and equipment <sup>f</sup> .....	114	n.a.	100	127	298	362
Livestock <sup>g</sup> .....	n.a.	111	100	156	135	149
Operating expenses <sup>h</sup> .....	n.a.	100	100	129	148	158

a Census date with interpolations for 1936 and 1946.

b Index of physical volume of production ÷ index of number of farms; figure for 1955 refers to the average production of the 1947-55 period.

c Index of physical volume of production ÷ the index of occupied land.

d Labour force survey data ÷ number of farms.

e Census data.

f Special compilation by Commission staff.

g Deflated value of livestock excluding horses ÷ number of farms.

h Deflated value of operating expenses as found in D.B.S. Reference Paper 25, Pt. II ÷ number of farms.

n.a. = not available.

increase in the investment in machinery per farm and an upward trend in the inventory of livestock. The increase in the volume of annual inputs, measured by the index of operating expenses in constant dollars, is also substantial. It is consistent with the trend toward more livestock and a greater degree of mechanization, because these require the annual purchase of more processed feeds and gasoline, oil, grease, etc. needed to operate machinery. As these changes have taken effect there has been an equally emphatic reduction in the number of horses used in farming and in the amount of human effort put into the production process. Each item in this changing process warrants separate discussion. The mechanical revolution, the reduction in the labour force, the increase in operating expenses and the increase in livestock carried will each be discussed in turn.

### 2. The Mechanical Revolution

The internal combustion engine and the pneumatic tire are not innovations of recent years. Their adoption in Canadian agriculture, however, is only becoming fully realized at the present time. Tractors, trucks and grain combines were all designed and available before the war. However,

prior to 1941, Canadian agriculture was recovering from a period of depression. Equipment was run down and much of the power being used was still horse power. The only region in which mechanization had made any significant impression was the Prairies, but even there many farms did not use mechanical power. During the war years few machines were available, and so it was not until after 1946 that farmers took full advantage of the range of power machinery developed for farm purposes. In physical volume the new investment in the ten years after the end of the war was three times as great as it was in the previous ten-year period.<sup>7</sup> By 1951 there were three times as many tractors per 100 farms as in 1941, five times the number of grain combines, and three times the number of trucks. Electric motors had increased fourfold.<sup>8</sup> During the period of mechanization, the rate of consolidation of farms was increased in the Prairie region. In eastern Canada land which was too steep or stony to be farmed by machine was abandoned. Thus, as the number of machines rose, the number of farm businesses fell.

Mechanization took effect at varying rates in each of the regions of Canada. The extensive nature of farming in the Prairie region was ideally suited to tractors, trucks, and combines, along with the full range of field machinery which go with them. Mechanization occurred at a greater rate and to a greater extent in the Prairie region and in Ontario than it did elsewhere in Canada. The most rapid increases occurred after 1948. In Quebec and in the Maritimes the small size of improved acreage per farm and the difficulty of consolidating units made mechanization costly. In these regions horse farming has continued to be more common than elsewhere.

The decline in the number of horses on farms followed as a direct result of mechanization. Farms in the Prairie region, in Ontario and in British Columbia dispensed with two out of every three horses per farm, while in the Maritimes and Quebec only one out of every four was displaced. The largest part of the fall in the number of horses occurred after 1946 as machines became available. The replacement of horses by tractors meant more economy in power in itself, but it also gave rise to the replacement of lighter horse-drawn equipment by heavier and more expensive tractor-drawn equipment. A considerable area of land which had previously been used to feed horses was made available to increase the livestock carrying capacity of farms. Some improved land, previously used for pasture, forage production and the growing of grain to feed horses, is now being used to feed other livestock intended for human consumption.<sup>9</sup>

<sup>7</sup> From 1936-45 new investment in machinery and equipment on farms was \$1 billion in 1949 constant dollars and between 1946 and 1955 it was \$3 billion.

<sup>8</sup> *Census of Canada, 1951*, Vol. VI, Pt. 1.

<sup>9</sup> It is estimated that the area of improved land released by the decline in the number of horses to grow feed for livestock amounts to at least five million acres.

The availability of machinery after the war and the restrictions in supply during the war undoubtedly accounted for a considerable part of the steep increase in mechanization. It was partly stimulated, however, by the increasing cost of labour as attractive job opportunities elsewhere drew farm workers into other occupations.

### 3. *The Labour Force*

The labour force in agriculture was almost constant over the period from 1926 to 1941. During the 1931-39 period there was some increase in the amount of labour on farms, but this was largely the result of unemployment in other sectors of the economy. There was considerable underemployment of farm labour in this period. When war broke out the labour force fell almost immediately and continued to fall until the strain of wartime production and the absence of machinery began to show. This, and the return of veterans to the land, helps to explain the rise in the labour force between 1943 and 1946. By 1946 the labour force in agriculture was back to the level it had been at in 1931. After the war the availability of other employment offering greater economic opportunity helped to pull labour off farms, while the machinery which became available was pushing people off the land because it allowed the production of a greater volume of output at a lower cost per unit. These trends are shown in Table 8. The drop in the labour force from 1946 to 1955 was 30% of the 1946 level. In 1946 agriculture employed 26% of the gainfully employed in Canada, but by 1955 only 15.3% of those employed worked in agriculture.

Table 8

#### THE LABOUR FORCE IN AGRICULTURE

<i>Year</i>	<i>No. of workers (thousands)</i>	<i>Year</i>	<i>No. of workers (thousands)</i>
1931.....	1140	1944.....	1067
1932.....	1159	1945.....	1075
1933.....	1178	1946.....	1186
1934.....	1197	1947.....	1110
1935.....	1217	1948.....	1097
1936.....	1236	1949.....	1067
1937.....	1255	1950.....	1007
1938.....	1274	1951.....	932
1939.....	1293	1952.....	889
1940.....	1259	1953.....	858
1941.....	1147	1954.....	873
1942.....	1068	1955.....	817
1943.....	1049		

SOURCE: D.B.S. Reference Papers Nos. 23 and 58 and *Labour Force Survey*, Monthly, 1955.



Regional trends in labour use follow the pattern of mechanization quite closely. Labour left farms more quickly in the Prairie region and in Ontario between 1946 and 1951 than it has since. In Quebec, however, the decline has been greater since 1951, while the rate of mechanization has increased. In the Maritimes the fall in the labour force seems to have more connection with other employment opportunities than with mechanization. The rate of decline was greater in the 1946-51 period than it has been since, and relatively more people have left agriculture in this region than elsewhere in Canada. In British Columbia the labour force has hardly altered, largely because of the expansion in land in farms and in the number of farms. The increase in mechanization in that province is just as striking as that in the Prairie region, but it has just kept pace with land development and the intensification of land use which has occurred.

A fall of 30% in the labour force in nine years is so great that it gives rise to many questions. Labour in agriculture is notoriously immobile. Yet this last decade has produced a mobility far in excess of that in any other period in Canadian agriculture. The circumstances have been very favourable to the changes which have taken place. Farming was prosperous, machines could be purchased and other job opportunities were attractive. In this rapid egress from farms the relative replacements of different types of farm labour have occurred at different rates. It is of some importance to future trends to consider the relative mobility of the three main classes of agricultural worker, namely the self-employed, the unpaid family worker and the hired man. In Table 9 the changes between 1946 and 1955 are set out.

Table 9

### CHANGES IN THE LABOUR FORCE IN AGRICULTURE BY CLASS OF WORKER

(1946-55)

	<i>All labour</i>		<i>Self-employed</i>		<i>Unpaid family</i>		<i>Hired</i>	
	Index	Percentage of total labour	Index	Percentage of total labour	Index	Percentage of total labour	Index	Percentage of total labour
1946.....	100	100	100	57	100	31	100	12
1951.....	79	100	88	64	68	26	67	10
1955.....	69	100	80	66	47	21	72	13

SOURCE: D.B.S. Reference Paper 58, *The Labour Force*.

As might be expected, the least mobile group of workers are the farmers themselves. Contrary to general expectations, the most mobile group has proved to be the family workers. As labour was displaced by machines and new jobs opened up, hired men and family workers left farms at equal rates until 1951. Since then, however, the hired labour



force has remained almost static while the unpaid family workers have continued to leave the farm. This is but another indication of the move toward a more commercial agriculture. The number of family workers who are prepared to work without specific monetary compensation becomes rapidly smaller as attractive jobs become available in a full employment economy and transportation to city employment becomes easily available. The present trend, in which self-employed workers are becoming a larger part of the total labour force, is likely to continue. Farmers running businesses without help of any kind are likely to become more and more common as time passes.

The increasingly commercial nature of agriculture is reflected in another way. Farming is becoming more dependent on other sectors of the economy. Some indication of this is found in the changes taking place in the composition of operating expenses.

#### 4. *Operating Expenses*

The real increase in cash outlay per farm between 1941 and 1955 was about 60% of the 1941 level (see Table 7). In the transfer from horse power to machine power there has been an increase in the purchases by farmers of gasoline, oil and grease, and in the application of technology farmers have increased their purchases of commercial feeds and seeds and fertilizer. These trends are reflected in the changes in cash operating expenses on farms (see Table 10).

Table 10

### CHANGES IN PHYSICAL VOLUME OF MAJOR INPUTS PER FARM (1941 = 100)

	1941	1946	1951	1954
Wages.....	100	74	80	72
Feed and seed.....	100	214	191	205
Gasoline, oil and grease.....	100	185	274	342
Truck expenses.....	100	150	280	338
Fertilizer.....	100	175	286	315

SOURCE: Compiled from D.B.S. Reference Paper No. 25, Pt. II and D.B.S., *Farm Income Series*, using relevant deflators.

The changes have a double significance. They imply that agriculture and other industries are becoming more interdependent, and they show that, relative to land and labour inputs, capital is being used at an increasing rate in Canadian agriculture. Yet another indication of this is the trend toward more livestock per farm and per acre.

#### 5. *Livestock*

The volume of livestock production on farms has shown certain cyclical movements in the past, with the result that the upward trend in the number

of livestock carried is neither so specific nor so definite as the trends in machinery and in operating expenses (refer to Table 7). Wartime demands from Canadian agriculture were for an increased volume of livestock, and all policies were directed to this end. Investment in livestock reached a peak in 1946 which has not yet been exceeded. It is clear, however, that the trend in livestock investment is upward, particularly in Ontario and the Prairie Provinces. In the Maritime region investment in livestock is still at less than half the level in Ontario, largely because of the small size of farm businesses.

#### *6. The Reorganization of Farm Businesses*

It is evident from the changes which have taken place on Canadian farms since 1941, and particularly since 1946, that important structural changes have been occurring. Since 1941 the area in farms has hardly altered, but the number of farms has declined. At the same time the most striking feature of farming has been the rapidity with which it has become mechanized. While this has been happening, output has been rising per farm, per acre, and per man. Costs have not risen steeply as output increased, because the process of mechanization has meant greater efficiency in the use of labour.

Canadian agriculture emerged in about 1930 from a period of rapid settlement and growth in which the grain-producing area of western Canada was established. New land development has continued since, but the process of land settlement, the establishment of new communities and the building of new farms is no longer taking place on a large scale in any region. During and since the period of settlement the size of farms has been adjusted to the physical and economic limitations of the regions in which they are situated. The process of economic adjustment is continuous. The consolidation of farms in western Canada and the return to forestry of land previously farmed in eastern Canada are signs of it. Innovations in farming technique cause a reshaping of farm businesses. In the processes of adopting new techniques and consolidating farms, increases in output per acre have come about and agriculture has gradually become more intensive.

The future development of Canadian agriculture will continue the processes found in each of these three stages. Land development and new settlement are likely to continue, but it is unlikely that any large amount of new settlement can occur. Farming in Canada is adapted to the physical environment, with certain minor exceptions, but the economic environment is constantly changing. As economic conditions alter, the reorganization of farm businesses is directed at increased output, both in absolute terms and also per acre and per man. The physical and economic differences are sufficiently great among the regions of Canada to produce patterns of farming which are affected differently by these changes.

It seems necessary, therefore, to consider the nature and extent of each element in the future growth of Canadian agriculture, if some outline of the economic structure of the industry is to result. Recent trends indicate that the demand for more food from Canadian farms is arising predominantly from the growing needs of a larger and more prosperous population. The first task, therefore, is to consider the demand for food, so that the amount and direction of future production can be established. It will then be necessary to consider the way in which the agricultural industry will produce this food, or how much of it will be produced domestically. The extent of Canada's land resources will be considered to reach a decision on the role land will play in the production process of the future. The nature of technological processes must be considered so that some idea can be obtained of the rate at which output per acre and per animal has increased and how these developments will occur in the future. These matters will be the concern of the next three chapters.

## THE DEMAND FOR CANADIAN FARM PRODUCTS

### *I. The Domestic Market*

The market in Canada for agricultural products has been expanding rapidly since the end of World War II. The main reason for this is the increase in the population from 12 million people in 1945 to 15.6 million in 1955, an increase of 30%. In the same period the purchasing power of disposable income per capita increased by about 7.5%. Canadian farmers have benefited from this sudden upsurge in population, because the spending power of the consumer has been maintained and increased. The dominant force in the domestic market is the number of mouths to be fed, and, provided an increase in this can occur without a reduction in per capita incomes, total food consumption will rise at about the same rate as population increases. It is not absolutely necessary that a 10% increase in population should give rise to a 10% increase in food requirements. The increase in population must be absorbed in such a manner that it gives rise to a proportionate increase in the output of the nation, and this output must be distributed among the increased population in such a way that effective demand materializes. Up to the present, population increases have occurred in the Canadian economy at a slower rate than productivity increases and have been accompanied by more purchasing power per capita.

In Canada, apart from the period when people were recovering from diets inflicted on them by the low purchasing power of the depression years, the amount, by weight, of food consumed per person has varied little from year to year. The increase in population in the last ten years, therefore, should have effected an increase of 30% in the demand for food on a weight basis.

This does not mean that all agricultural producers are now selling 30% more in the domestic market. The other major factor influencing the de-



mand for food is the amount of money consumers have to spend. If this is increased they spend more on food, not to buy increased quantities of all foods, but to buy more of the protein foods such as meat and eggs, which cost more per calorie than foods such as potatoes and bread.

In considering the direction of the future demand for food in the domestic market, therefore, most attention must be given to the expected increase in population and to the extent to which purchasing power will rise. Other things such as education about the nutritive value of foods, the age structure of the population, and the prices of foods relative to the prices of non-foods affect the pattern of food consumption. These factors, however, are reflected in population and income trends. The age structure of the population affects the rate of growth in the population. Concern over nutritive values and price relationships changes as incomes rise, and the effect is seen in the changing emphasis on particular foods within the total diet.

Attempts to determine population increases over some future period of time have frequently been made, and, as time has passed, they have been proved to be rather unreliable. Demographers have attempted to improve their projections and have made some progress in recent years. Nevertheless, success in forecasting population increases becomes more hazardous as the period of the forecast lengthens. Population estimates were prepared for the Commission and are discussed in detail elsewhere.<sup>1</sup> The indication given by these estimates is that in the next ten years population will increase from 15.6 million to 19.5 million people, an increase of 25%. By 1980 the population is expected to reach 26.7 million people, an increase of 70% over the 1955 level. This implies a large increase in the domestic market for agricultural products. The increase in the next ten years is not expected to be as great as that in the last ten years, but over the 25-year period, a 70% increase is a much greater enlargement of the domestic market than that of the last 25 years. Between 1930 and 1955 the increase in the Canadian population was 54%. The domestic market, therefore, is likely to become more and more important to the agricultural producer. If such an increase in population takes place, agricultural producers will not need to search for markets. Canadian farmers will have to increase output and will be less concerned with export markets for most agricultural products.

The increase in the domestic consumption of food by weight must be broken down into individual food components before the implications for agricultural production become clear. More income per person means more demand per person for better quality foods. Both sources of increased demand, population and rising incomes, will make for increased demands

<sup>1</sup> See the Commission study entitled *Output, Labour and Capital in the Canadian Economy* by Wm. C. Hood and Anthony Scott.



on agricultural resources. The effect of population growth, however, will be much greater than that of rising incomes.

The best measure of income for this purpose is the amount of income left after taxes, expressed on a per capita basis. This is known as disposable income per capita. As the population grows, it can be expected that means will be found to increase productivity per person and thus increase the level of living of the whole nation. The amount of disposable income per capita will rise as productivity increases. Estimates of the extent to which this is likely to take place have been prepared for the Commission.<sup>2</sup> The trend of the estimates is shown in Table 11.

Table 11

**TRENDS IN DISPOSABLE INCOME PER CAPITA**  
(1935-39—1951-55 with projections for 1965 and 1980)

	1949 <sup>a</sup> dollars	Index 1955 = 100
Average 1935-39.....	566	56.8
Average 1951-55.....	954	95.7
1965.....	1,158	117.6
1980.....	1,655	168.0

<sup>a</sup> Deflator — Consumer Price Index — 1949 base.

SOURCE: 1935-39 and 1951, D.B.S. National Accounts; 1965 and 1980, Commission estimates.

These estimates suggest that by 1965 there will be 25% more people with about 18% more income per person, and that by 1980 there will be 70% more people with about 70% more income per person. As incomes rise, people spend less of the increase on food and more on other things. In Canada, people are unlikely to want much more food per capita as their incomes go on increasing. Instead of more food they will want to purchase more consumer durables, better household furnishings and other things which many of them still lack. The change in food demands will be reflected in demands for more services with food, such as better graded food and more cleaning and packaging before sale. Until the present, food expenditure has declined only slightly as a proportion of disposable income, but the proportion of this which is expenditure for food as it leaves the farm has declined by a greater amount. This trend will continue. More of the money consumers spend on foods will go to distributors and processors, and some of it will be spent on the import of the expensive varieties of unusual foods.

<sup>2</sup> See the Commission study entitled *Consumption Expenditures in Canada* by David W. Slater.

Markets will expand in varying degrees, depending largely upon the changing pattern of food consumption. Changes in diet are already well under way. They occur so slowly that people are hardly conscious of the changes they are bringing about. Some measure of the rate at which they have been occurring can be derived from official statistics on the domestic disappearance for human consumption of the major food items. At the time of this study, statistics on food consumption per person for the years prior to 1935 were not calculated on a basis comparable to those for the years 1935 to date. The War years gave variations in consumption which were not entirely normal. Food rationing and the rapid change in disposable incomes, along with the short supply of alternatives on which income might be spent, contributed to the changes which occurred. Between the 1935-39 period and the 1951-55 period there are sufficient differences to indicate the degree to which the longer run changes in diet are having their effect.

It is perhaps necessary to indicate that per capita consumption of individual food items is apt to show considerable annual variation. Particular attention must be given to this when deciding on suitable periods for a comparison of trends. The supply of most food items is liable to fluctuate from year to year much more than the supply of other items produced for consumers. This is because agriculture is a biological industry and the supply of food products is not completely under the control of man. In many cases, also, the fluctuations in supply cannot be controlled through storage from one year to another because the products are perishable. This means a considerable price variation from year to year which is reflected in consumption patterns. A consideration of the annual average consumption over two five-year periods is a better comparison than that between two individual years. Even so, considerable attention must be paid to the relative supply conditions of the two periods used. Such difficulties arise more in livestock production than elsewhere. For these reasons, the consumption rates compared for this study are average annual rates over five-year periods, and, while account was taken of trends over the war and immediate postwar years, they were used to interpret the significance of the change between the prewar period and the 1951-55 period. This was necessary because the intervening period shows considerable abnormalities which are unlikely to affect long-term trends.

The changes in consumption which have taken place have been considered in relation to changes in disposable income over the same length of time. The relationship between disposable income and consumption of particular foods was the main guide used in making projections, but consideration was also given to other changes which might modify the result of projections.

Table 12

**TRENDS AND ESTIMATES OF PER CAPITA CONSUMPTION**  
*(1935-39—1951-55 with estimates for 1965 and 1980)*

	1935-39 average	1951-55 average		1965		1980	
	Lbs. per capita	Lbs. per capita	Percentage 1935-39	Lbs. per capita	Percentage 1935-39	Lbs. per capita	Percentage 1935-39
Cereals.....	202	166	82	152	75	128	63
Potatoes.....	200	145	72	130	65	110	55
Other starches.....	106	108	102	108	102	105	99
Fruits.....	113	169	149	177	156	223	197
Vegetables.....	127	136	107	138	108	145	114
Oils and fats.....	16	29	179	32	198	35	216
Dairy products.....	449	448	100	438	98	418	93
Red meats.....	117	140	119	147	125	169	144
Poultry meat.....	21	28	130	29	133	33	154
Eggs.....	31	35	114	38	124	45	147

NOTE: Consumption figures are in retail weight except for fruits and vegetables which are in fresh equivalent and meats which are dressed carcass weight. Butter is excluded from oils and fats and included under dairy products.

SOURCE: D.B.S. data on per capita consumption and Commission estimates on future trends.

The direction in the consumption of cereals and potatoes is clear. There is no reason why this trend should not continue. Cereal consumption is largely the consumption of wheat and rye as bread and, as incomes rise and people do less hard physical work, they require less direct energy in this form. The same is true of potatoes. Consumption of potatoes in the form of potato chips is increasing, but this is insufficient to offset the decreasing importance of potatoes in the general diet.

There is a notable trend upward in the consumption of fruits. This has been largely an increase in the use of citrus fruits with little alteration in the consumption of other fresh fruits. It reflects the increase in consumption of fruit juices and of citrus fruit in the fresh and concentrated form. The significance of this trend, therefore, is that imports of citrus products are likely to rise steeply as population increases and incomes rise.

Vegetables in both fresh and processed forms are becoming increasingly important in the diets of Canadians. The increases in consumption are not so striking as the increase in citrus fruits, but they are sufficient to indicate that the Canadian population is willing to spend more money on fresh and frozen vegetables as their incomes rise.

Consumption of oils and fats has varied very little when the total of all oils and fats is taken as a group with butter included. It seems unlikely that any change will take place in total intake in the future. However, medical knowledge and consumer education may well alter the pro-

portions of each coming from animal and vegetable sources. At present, there is no means of judging the impact of these factors on future consumption. When butter is excluded from the oils and fats group a noticeable trend appears. The increase in oils and fats other than butter has been quite considerable. It is the result of a large increase in the consumption of margarine and the use of items like salad dressings. The general process seems to be a distinct substitution of oils and fats of vegetable origin for those of animal origin as technological changes result in the production of vegetable fats in more palatable forms and at less cost than those of animal origin.

Butter consumption has been considered along with other dairy products in Table 12 because, for production considerations, this is where it is of most importance. The substitution process among oils and fats is such, however, that it must be considered in relation to them also. Butter consumption in Canada fell from an average of 31 pounds per capita in the 1935-39 period to an average of 21 pounds in the 1951-55 period. There was a sharp fall of 4.5 pounds per capita between 1948 and 1949 owing to the legalization of the sale of margarine in most provinces of Canada. Since then the decline has been slow but steady. A further decline to 18 pounds in 1965 and to 15 pounds by 1980 is included in the projection for dairy products. In making this projection it was assumed that butter substitutes will be used more widely in the future, although their effect on butter consumption may not be as great as it has been recently. It was assumed further that the removal of all legal restrictions on the use of margarine would be unlikely in the short run.

Butter prices have moved within a narrow price range over the last five years during which a government price support programme has been operative. The prices of butter substitutes have been uncontrolled, but the legal restrictions on their use has been a factor in controlling their consumption. If the price of butter does not rise as the general level of prices rises in the future, it may become cheaper relative to the price of substitutes than it is at present. This could go a considerable way toward halting the present rate of substituting margarine for butter. These possible changes have been taken into consideration in the projections made for butter and other oils and fats. There is considerable room for error in these projections, but the implications which might result from errors are largely of regional importance.

The trend in the consumption of dairy products per capita is a composite of the trends in four main items: fluid milk, cheese, butter and other milk solids. Butter consumption is mainly responsible for the slight downward trend in the over-all consumption of dairy products. There was little change in the average consumption of fluid milk between the 1935-39 and 1951-55 periods. The other major changes are an increase in cheese



consumption and a rise in the consumption of dried milk powders. There is considerable difficulty in determining how these trends will develop in the future.

It can be expected that strides in the technological process of producing milk powders will be made and that these will prevent any increase in fluid milk consumption. If the changes bring about a perfect dried milk substitute, the fall in fluid milk consumption could be considerable. It is considered likely that progress in this direction will be made. By 1980 it is expected that fluid milk consumption will have declined by about 8% and that milk powder consumption will have risen by about 30%. Cheese consumption has increased a great deal in recent years. Packaged and processed cheddar has made a difference in the consumer attitudes toward cheese. Canadians have generally consumed less of this product than other nations. The trend in the consumption of domestic cheddar and of imported cheeses is likely to continue upward.

The increases in per capita consumption of greatest significance to Canadian agriculture are those of meat, poultry and eggs. Meat consumption was at a very high level in 1955 compared to recent times. This explains why the average consumption of the 1951-55 period is less than that of 1955. Beef and pork, the main constituents of meat consumption, are at present available in a volume significantly higher than in the recent past, because of a cyclical movement of livestock numbers on farms. Beef and pork constitute between 85% and 90% of the consumption of meats. Mutton and lamb are not consumed heavily in Canada. The trend in their consumption may continue downward to 1965 and level off thereafter. Canadians will continue to demand more red meats, however, because this is one group of foods which is distinctly affected by the level of income. In the past a preference has been shown for beef rather than pork. Advantages in growing grain and changes in technology produce greater economies in hog production than in beef production in Canada. In the long run pork consumption may gain relative to beef because it is likely to be obtained more cheaply. This is a basic assumption in the consideration of the production changes which may come about in the next 25 years. Because of the recent high volume of consumption of red meats, it was considered unlikely that by 1965 the per capita consumption would reach a level much different from the present peak consumption. Most of the increase in disposable income will probably come after that date as well, and so it has been considered that the greatest increase in per capita consumption of red meats will occur between 1965 and 1980. The same general pattern is suggested for poultry meat and for eggs.

Trends in per capita consumption give a clear indication of the direction of the domestic market for Canadian farm products. In bold outline they suggest that by 1965 consumers will be asking for about two-thirds



to three-quarters of the potatoes and cereals they consumed per capita in the 1935-39 period and that by 1980 they will be approaching only half that rate. By 1965 they will want about one-quarter more meat, eggs and poultry per capita than was consumed in the 1935-39 period. By 1980 consumption of these commodities will have risen to about 150% of that level. The per capita consumption of dairy products is unlikely to rise, and the consumer will be asking for larger amounts of fruits and vegetables, although with respect to these it seems likely that imports will increase. The combined effect of population trends and the changes expected in per capita consumption is brought out in Table 13.

In all instances where the estimate of per capita consumption is expected to rise, the total domestic demand is expected to rise considerably more in proportion after 1965 than before. The increase in population between the average of the period 1951-55 and 1965 is estimated at 32% and between the average of the period 1951-55 and 1980 it is estimated at 81%. It is evident, therefore, that irrespective of changes in consumption habits, considerable increases in output are called for in livestock and livestock products. The total domestic consumption of red meats and poultry meat is expected to increase by 40% by 1965 and to double by the end of the 25-year period. The consumption of eggs is expected to rise at a slightly steeper rate, as is the consumption of fruits.

No matter what the magnitude of error of these estimates is, the implication for Canadian agriculture is clear. The domestic market for meat and meat products and for eggs will be strong throughout the period, and it will gain in strength as the period lengthens. The weakest markets will be those for the direct consumption of cereals and potatoes. The total market prospects for dairy products, while they have some elements of strength — such as the demand for dried milk powders and cheese — are not likely to develop at the rate at which the population expands, although the purely domestic requirements may be expected to increase at approximately the same rate as population. Those farmers who are in a position to grow oil-bearing crops will find a strong market for them. The domestic market is likely to absorb all the fruit and vegetables which can be grown in Canada, and imports of these commodities will rise in volume.

Trends in demand of this order will require a considerable shift in the use of our agricultural resources. So far, production of agricultural products has kept ahead of consumption. It is useful, therefore, to consider the changes in aggregate consumption together with present production levels. This gives some idea of the increases in output which will be called for, if increased domestic consumption is to be supplied from domestic production. In Table 14 output of livestock products in the average of the 1951-55 period is compared to consumption requirements in 1965 and 1980. The demands have been converted back into the form in which

Table 13

**TOTAL CONSUMPTION OF THE MAJOR FOOD ITEMS**  
*(1935-39—1951-55 with estimates for 1965 and 1980)*

	1935-39		1951-55		1965		1980	
	Average mil. lbs.	Percentage 1951-55	Average mil. lbs.	Percentage 1951-55	mil. lbs.	Percentage 1951-55	mil. lbs.	Percentage 1951-55
Cereals.....	2232	92	2445	100	2967	122	3411	140
Potatoes.....	2212	103	2145	100	2538	119	2931	134
Other starches.....	1168	73	1597	100	2116	132	2796	175
Fruits.....	1248	50	2492	100	3447	138	5930	237
Vegetables.....	1400	70	2006	100	2684	134	3864	193
Oils and fats.....	179	42	428	100	625	146	933	218
Dairy products.....	4953	75	6621	100	8556	129	11,150	168
Red meats.....	1296	63	2065	100	2869	140	4504	218
Poultry meat.....	236	57	411	100	556	136	879	214
Eggs.....	339	65	518	100	742	143	1199	231

Weights are expressed at retail, except in the case of fruits and vegetables, which are in fresh equivalent, and meats, which are dressed carcass weights. Data for 1935-39 and 1951-55 are averages of the annual rate of domestic disappearance for human consumption in the years indicated and are compiled from D.B.S. data. The figures for 1965 and 1980 are Commission estimates.

they would be met from the farm. For example, meat requirements have been converted from dressed carcass weight to output expressed as number of animals, and the demand for dairy products is assessed in terms of milk production.

Table 14

## REQUIREMENTS IN TERMS OF LIVESTOCK NUMBERS AND OUTPUT

*(1951-55 average and projected requirements 1965 and 1980)*

		1951-55	1965		1980	
		Average		Percentage 1951-55 average		Percentage 1951-55 average
Hogs.....	output number (thousands)	7,570	10,100	133	16,200	214
Cattle for beef..	output number (thousands)	2,040	2,600	127	4,200	206
Veal calves.....	no. slaughtered (thousands)	1,180	1,500	127	1,575	133
Milk cows.....	on farms June 1 (millions)	3.1	3.3	105	3.5	112
Milk output....	whole milk (billion lbs.)	16.3	18.5	113	24.6	151
Hens.....	on farms June 1 (millions)	26.8	29.3	109	37.1	138
Eggs.....	(million dozens)	388	518	133	820	211

Certain rates of improvement in milk output per cow and in egg production per hen have been allowed for in arriving at these figures. The process of technological improvement is discussed in detail in Chapter 4.

In recent years almost all the production of livestock and livestock products has been absorbed by the domestic market, and so production requirements by 1965 approximate closely the rates of increase in food consumption. These production requirements bring out a point of major importance to agriculture. The expansion required to meet the requirements of 1965 seems to be well within the technical ability of the industry with its present organization.

In 1955 the output of meat animals was running at a peak level. The output of beef animals in that year was 2.4 million head. To meet

the 1965 estimate, only 0.2 million head more would be required, an increase of only 8%. In the case of hogs the 1965 requirement would be 2 million above the 1955 peak, an increase of 20%. If the past rate of increase in yield per cow is continued, the consumption of dairy products in 1965 would require the carrying of about 6% more cows than in 1955.<sup>3</sup> The number of hens required, assuming technological processes to continue at past rates, would be 9% more than in 1955. Thus in the shorter period the only substantial increase called for would be in hog production. However, over the longer run between 1965 and 1980, the trend in domestic demand indicates that a very substantial increase in both hog and cattle production would be required to meet the demands from domestic production.

The total amount of grain consumed by livestock in 1954-55 was about 12 million tons. Assuming no substantial increases in the efficiency of feeding, the increases in grain required to produce the extra livestock and livestock products would be about 30% above this in 1965 and 90% above it in 1980. The available supply of feed grain in 1955 would have been sufficient to meet the 1965 feed requirement and leave a very substantial surplus. Much more difficulty is involved in assessing the extra pasture required. A discussion of this is reserved for Chapter 5.

## *II. Export Markets*

Canada exports a variety of agricultural products. Wheat is the crop of outstanding importance, but export markets have been found for barley, oats, rye, flax, potatoes, grass seeds, tobacco and apples. Livestock and livestock product exports have been made up largely of pork and bacon and cheese. The major influences on the future prospects of Canadian agriculture arising out of shifts in the export market are most likely to come in grain and meat exports. For this reason some detailed attention will be given to the influences which have shaped these markets and to factors affecting future markets for these products. Other agricultural products which enter export trade are important to specific local areas. Export prospects for them cannot be traced with much certainty.

Undoubtedly the major concern of agriculture in the export markets of the next 25 years is wheat. It has always been the major agricultural export and a very important part of Canada's total exports. For some considerable time Canada has exported about 60% of her wheat production and in some years the percentage has been much higher than this. The importance of the wheat crop to both agricultural production and international trade can be judged from Table 15.

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<sup>3</sup> This assumes that some of the fancier cheeses will be imported.



Table 15

**WHEAT ACREAGE PRODUCTION AND DISPOSITION**  
*(average of 1926-30 and 1951-55)*

	1926-30 average	1951-55 average
Acreage (million acres).....	23.9	25.7
Yield (bu. per acre).....	18.3	20.5
Production (million bu.).....	437	527
Domestic disappearance (million bu.)...	121	141
Net exports (million bu.).....	296	300
Average carryover (million bu.).....	88	300

SOURCE: D.B.S., *Grain Trade of Canada*.

*1. Wheat.*

The export prospects for wheat can be best arrived at by considering, first, the trend in the volume of world trade and, second, the factors which may affect Canada's share of that trade.

*(a) The volume of world trade in wheat*

Two significant trends are evident in the trade pattern for wheat over the period since 1900. There has been, first, a movement upward in the volume traded, and second, an increase in the proportion of the total coming from four major exporters, Canada, the United States, Australia and Argentina.

At the beginning of this century the production of wheat in North America and in the Southern Hemisphere was rising rapidly. Wheat consumption was increasing and the volume exported rose from 475 million bushels at the turn of the century to 735 million bushels in 1911-13. The major part of the increase in supply came from the four exporters mentioned above. Most of it was exported to Europe, where the degree of protection for home-produced wheat was small, amounting to little more than moderate import duties.

In the period from 1920 to 1930, the production of the four major exporters continued to expand, as did the volume of world trade. Owing to the effects of war, production of wheat in Europe was low and recovered slowly. Imports were maintained at a high level through the use of foreign loans. In this period the four major exporters became even more dominant, supplying 87% of the market. Two other countries which had been substantial exporters of wheat became less important. India ceased exporting because of the increased pressure of population and Russia substantially reduced the amount exported.

Between 1930 and 1939 the wheat market suffered from the effects of depression and chronic surpluses. The production of wheat in Europe had



reached the level of prewar days and the expansion which had taken place elsewhere was maintained. The price of wheat collapsed to reach the lowest level in 1932 that has ever been recorded. Importing countries tried to protect and increase domestic output in order to reduce foreign exchange difficulties and stabilize their domestic agricultures. The exporting countries tried to protect their wheat growers from the worst effects of the market collapse. There was a fall in world trade and an increase in the emphasis on self-sufficiency. It was not until the drought years of 1937 and 1938 in North America that prices showed any sign of recovery. The 1938-39 crop was good, however, and, with the outbreak of World War II, the possibility of surplus production was becoming evident again.

During World War II and immediately after it, dependence on supplies of wheat from North America was greatly increased. Production was increased sharply in this area because of high yields and increases in acreage. The other major exporters, Australia and Argentina, suffered a decline in production because of drought and a general shortage of men and materials. Production in Europe and the U.S.S.R. was seriously reduced by the war and the results of war devastation. The volume of wheat exports in postwar years mounted steadily to a peak of 1,066 million bushels in 1951, and, since then it has continued at a level considerably higher than in prewar years. Since 1945 the average annual volume of world trade in wheat has been more than 70 million bushels higher than the level of trade in the 1920-29 period.

Certain exceptional circumstances can be found for the high level of trade immediately after the war. Wheat production in most countries outside of the four major exporters did not regain the prewar level until 1951. In 1947-48 it was only 35% of the prewar level. Much of the expansion in production in North America was needed, therefore, to make up for the low production in European countries. In addition to this, rice production had fallen to 17% below the prewar level, recovery in the production of rice was slow, and the population in the Far East had grown rapidly. Asia, which in prewar days was a net exporter of rice, became a net importer. But the amount of rice entering world trade was only 50% of the volume in prewar days, and this increased the demand for other cereals from Asiatic countries. Before the war Asia imported about 1.3 million tons of wheat annually, but by 1951 the total import was nearly 7.4 million tons. As a result of a substantial recovery in rice production since 1952, demand in Asia has slackened for both wheat and barley.

These exceptional circumstances, the effects of war devastation and a general shortage of rice, both came to an end at about the same time. Exceptional crops in North America and a substantial recovery to more normal production in the Southern Hemisphere produced a supply of wheat from 1951 to 1955 which has been well in excess of export require-

ments. A surplus has accumulated in the hands of the major exporters, and in North America particularly. The presence of this surplus has given rise to speculation regarding the volume of future trade in wheat. Despite a considerable reduction in acreage in the United States, the production of wheat in the major exporting countries has continued to be above domestic and export requirements. The main reason for this seems to lie in exceptional weather conditions in four out of the last five seasons of production in North America.

Nevertheless, the volume of world trade has remained substantially higher than in prewar years. This suggests that there may be a longer term influence exerting an upward pressure on the volume of trade. Such pressure could be influenced either further upward or downward by two major influences on the wheat market. The first is the effect of the domestic policies of importing and exporting countries, and the second is the trend in the per capita consumption of wheat.

The agricultural policies of wheat-trading countries are likely to influence considerably the pattern of future wheat exports and the total volume of wheat exported. Agricultural policies seem to have more permanent aspects at present than they did in the period of wheat surpluses in the 1930's. Measures taken then were distinctly stopgap in nature. Policies now in operation may be modified in the future, but they are not likely to be radically altered.

In wheat-importing countries the policies followed are too diverse to be dealt with individually. The price policies being followed in Europe have gone hand-in-glove with more general agricultural policies. Attempts have been made to encourage the use of domestic resources and thereby reduce imports. Measures to improve agricultural productivity have been introduced at the same time, in the hope that the cost of support could be reduced through higher productivity.

In the Far East there have been policies to develop rice production since the serious shortage of 1951-52. Plans for the general development of agriculture, including the expansion of wheat production, are being put into effect in most of the underdeveloped countries. Land productivity is being increased through irrigation, reclamation and the use of new techniques. These policies are receiving help and support from the developed countries. They are aimed at a greater degree of self-sufficiency in food through the application of capital and skilled knowledge to their own land resources.

The exporting countries are all committed to policies which protect their producers to some degree. In every case the government participates in the marketing of wheat in some form. The United States tries to maintain a form of parity between farm and non-farm prices. This has protected the American producer to some extent from the effects of changing demand

and has encouraged production at artificially high prices. Acreage controls have been put into effect in times of excessive supply such as the present. In Canada and Australia farmers receive an initial price which takes on the significance of a minimum price. In both countries the initial price has been below that ultimately obtained for exports, and producers have received supplementary payments when the crop has been sold. It can be argued that this price guarantee acts as an incentive to production, because it provides a bottom to the market. The producers, however, have received prices based on the world market, and the total return per bushel has been lower than in any other country. Downward adjustments have been transferred to producers, even though the effect is somewhat delayed through the initial payment system. In Argentina, Turkey and France the producer's price is fixed by the government, though the price is arrived at by different methods in each country. It has been above export levels in France in the postwar years, but this was not the case in Argentina until 1951-52. Although production may develop independently, being sheltered from the world market, losses on exports may force these countries to reconsider the level of price support. France has already found this necessary.

National agricultural policies do not seem to be following directions which are likely to promote a larger volume of trade in wheat. On the export side, nations are anxious for protection and stability, and, on the import side, a desire for similar conditions is likely to perpetuate policies encouraging domestic production protected from the effects of lower priced importation.

Some of the trends discussed here are illustrated by statistics on world production and trade in wheat. These are shown in Tables 16, 17, 18, and 19 (see pages 43 to 45).

Population growth over the next 25 years will raise considerably the aggregate consumption of food. The effect of population growth on the volume of wheat entering world trade is much less certain. Wheat consumption per capita varies widely over the world and trends in use for human consumption are affected by the levels of income and available supplies of other cereals.

The main wheat-trading countries in the world can be classed in four groups in relation to trends in the per capita consumption of wheat. In the first group per capita consumption is generally declining. It consists of countries with moderately high standards of living and rising incomes per capita. The second group shows a more intermediate pattern. Consumption of cereals is declining, but the per capita consumption of wheat is increasing. This group consists of the countries of northern Europe in which wheat is being substituted for rye in the bread diet, as the standard of living rises. The third group consists of countries in which the standard of living is less well advanced, so that the consumption of cereals is high.

Table 16

## WHEAT AND WHEAT FLOUR — WORLD EXPORTS, BY PRINCIPAL COUNTRIES

(averages: 1900-53; annual 1945-54)

	Total Overseas Exports								Total export <sup>b</sup> mil. bu.
	Argentina percentage	Australia percentage	Canada <sup>b</sup> percentage	U.S. <sup>a</sup> percentage	Total mil. bu.	Percentage of total exports	Eastern exports <sup>c</sup> percentage	Other percentage	
1900-09 <sup>d</sup> .....	14.1	4.4	6.4	26.0	303	50.9	38.7	10.4	596
1910-19 <sup>d</sup> .....	13.4	8.3	19.2	27.5	455	68.4	19.6	12.0	665
1920-29 <sup>d</sup> .....	18.4	10.5	31.8	26.4	732	87.1	4.8	8.1	840
1930-39 <sup>d</sup> .....	18.3	16.1	28.3	10.6	520	73.3	12.5	14.2	710
1945-53.....	7.9	9.9	30.6	42.1	825	90.5	3.9	5.6	912
1945.....	7.9	4.2	42.1	45.7	856	99.9	—	0.1	857
1946.....	7.9	6.2	30.6	52.4	736	97.1	0.8	2.1	758
1947.....	10.9	10.2	22.2	51.8	893	95.1	4.3	0.6	939
1948.....	6.2	12.4	22.5	51.1	909	92.2	5.4	2.4	986
1949.....	10.7	13.8	28.6	36.2	737	89.3	6.6	4.1	825
1950.....	11.0	13.6	23.6	39.0	817	87.2	3.9	8.9	938
1951.....	2.8	9.3	32.6	44.6	951	89.3	5.1	5.6	1,066
1952.....	3.0	10.0	39.7	32.2	838	84.9	4.9	10.2	987
1953.....	12.5	8.1	32.8	24.7	686	78.1	5.1	16.8	879
1954.....	13.9	10.0	26.8	29.1	752	79.8	— <sup>e</sup>	20.2 <sup>e</sup>	943

<sup>a</sup> Excludes the wheat equivalent of exports of flour milled in bond; includes principal products other than flour.<sup>b</sup> Includes exports of "wheat unfit for human consumption" from Canada to U.S. as follows: 1950-51, 12 mil. bu.; 1952-53, 20 mil. bu.; 1953-54, 4 mil. bu.; 1954-55, 3 mil. bu. Also includes wheat exported to the U.S., a part of which was milled in bond and later exported by the U.S.<sup>c</sup> Includes U.S.S.R.<sup>d</sup> Calendar years.<sup>e</sup> Eastern Europe combined with "other".SOURCE: *The Wheat Situation*, U.S. Department of Agriculture, AMS .. Oct. 31, 1955.



Table 17

**WORLD WHEAT ACREAGE, AVERAGE, MILLION ACRES**  
*(average 1935-39 to 1955-56)*

	Overseas <sup>a</sup> exporters	European exporters	Ex. European exporters	European importers	Ex. European importers	Total <sup>b</sup> world
Average 1935-39.....	111.8	26.8	47.5	46.7	6.1	247.9
Average 1940-44.....	100.4	17.9	46.3	44.7	7.2	226.7
Average 1945-49.....	119.8	18.5	44.7	42.5	5.8	240.6
1950.....	113.3	20.2	46.7	45.2	7.2	243.0
1951.....	104.0	20.5	47.0	45.3	6.5	235.2
1952.....	120.8	20.2	47.3	45.6	6.5	253.8
1953.....	116.3	20.3	47.7	45.4	6.7	252.3
1954.....	102.0	20.8	53.0	47.1	6.6	245.2
1955 <sup>c</sup> .....	79.5	20.5	51.6	46.5	7.1	n.a. <sup>d</sup>

a The grouping of countries used in this table is after W. Malenbaum, *The World Wheat Economy*, Harvard University Press, 1955. The data for individual countries can be found in Table A1, Appendix A to this report.

b Includes more countries than are contained in the classified groups.

c Preliminary.

d n.a. — not available.

SOURCE: *The Wheat Situation and Foreign Agriculture*, Circular, U.S. Department of Agriculture.

Table 18

**WORLD WHEAT PRODUCTION, MILLION BUSHELS**  
*(average 1935-39 to 1955-56)*

	Overseas <sup>a</sup> exporters	European exporters	Ex. European exporters	European importers	Ex. European importers	Total <sup>b</sup> world
Average 1935-39.....	1462.5	561.7	497.3	1029.0	129.1	3815.3
Average 1940-44.....	1696.7	290.3	492.4	838.1	130.2	3583.4
Average 1945-49.....	1940.1	318.0	454.0	854.0	97.2	3788.4
1950.....	1878.4	392.0	521.4	1044.6	120.6	4107.0
1951.....	1770.4	430.0	514.2	1047.2	129.3	4096.1
1952.....	2465.9	402.0	485.3	1152.0	122.3	4866.5
1953.....	2209.3	420.0	548.3	1195.4	133.3	4800.3
1954.....	1718.0	390.0	619.1	1240.5	143.6	4291.2
1955 <sup>c</sup> .....	1795.0	410.0	596.9	1241.7	135.3	4439.8

a The grouping of countries used in this table is after W. Malenbaum, *The World Wheat Economy*, Harvard University Press, 1955. The data for individual countries can be found in Table A2, Appendix A to this report.

b Includes more countries than are contained in the classified groups.

c Preliminary.

SOURCE: *The Wheat Situation and Foreign Agriculture*, Circular, U.S. Department of Agriculture.



Table 19

**WORLD WHEAT YIELDS, BUSHEL PER ACRE**  
**(average 1935-39 to 1955-56)**

	Overseas <sup>a</sup> exporters	European exporters	Ex. European exporters	European importers	Ex. European importers	Total <sup>b</sup> world
Average 1935-39.....	13.0	20.9	10.5	22.0	21.1	15.4
Average 1940-44.....	16.9	16.2	10.6	18.7	18.1	15.8
Average 1945-49.....	16.2	17.2	10.2	20.1	16.8	15.7
1950.....	16.6	19.4	11.2	23.1	16.7	16.9
1951.....	17.0	21.0	10.9	23.1	19.9	17.4
1952.....	20.4	19.9	10.3	25.3	18.8	19.2
1953.....	19.0	20.7	11.5	26.3	19.9	19.0
1954.....	16.8	18.8	11.7	26.4	21.8	17.5
1955 <sup>c</sup> .....	20.3	20.0	11.5	26.7	19.0	20.3

a The grouping of countries used in this table is after W. Malenbaum, *The World Wheat Economy*, Harvard University Press, 1955. The data for individual countries can be found in Table A3, Appendix A to this report.

b Includes more countries than are contained in the classified groups.

c Preliminary.

SOURCE: *The Wheat Situation and Foreign Agriculture*, Circular, U.S. Department of Agriculture.

The per capita consumption of wheat is high, but it may soon start to decline. In the fourth group, the countries are still extremely poor. The consumption of other grains is greater than the consumption of wheat, and the per capita consumption of all cereals is rising. Wheat consumption per capita is rising very slowly.

Malenbaum uses prewar data to illustrate this grouping.<sup>4</sup> In Tables 20 and 21 his data are shown along with some postwar figures. These tend to substantiate the classification.

The European importers of wheat fall into the first group, in which per capita consumption is declining. Population growth in these countries is much slower than in other parts of the world. When this is considered,

<sup>4</sup> W. Malenbaum, *The World Wheat Economy*, Harvard University Press, 1955.

The countries are classified as follows:

A. Declining consumption;

Australia, Canada, United States, Belgium and Luxembourg, France, Spain, Switzerland, United Kingdom, Ireland and New Zealand.

B. Intermediate consumption;

Denmark, Finland, Germany, The Netherlands, Norway and Sweden.

C. Increasing consumption;

Argentina, Bulgaria, Hungary, Rumania, Yugoslavia, Chile, Uruguay, Greece and Italy.

D. Other Countries;

Increasing consumption with wheat a minor part of the grain diet;

French Morocco, Tunis, Poland, Portugal, Egypt, India, Pakistan and Japan.

Table 20

# WHEAT CONSUMPTION, SELECTED COUNTRIES

(bushels per capita per annum)

	1885-89	1919-24	1924-29	1929-34	1934-39 <sup>a</sup>	1946-47 <sup>b</sup>	1947-51 <sup>b</sup>
GROUP A							
Australia.....	5.10	5.3	5.05	4.91	4.62	4.8	4.6
Canada.....	5.14	4.85	4.54	4.13	3.98	n.a.	3.6
U.S.A.....	5.34	4.19	4.19	3.80	3.62	3.5	3.2
New Zealand.....	6.04	4.90	4.62	4.47	4.11	n.a.	3.8
U.K.....	5.47	5.40	5.16	4.95	4.90	n.a.	3.9
France.....	7.66	7.03	7.12	6.98	6.50	4.9	5.2
Switzerland.....	5.17	4.48	4.62	4.90	4.80	n.a.	4.3
GROUP B							
Denmark.....	1.42	2.33	2.65	2.52	2.57	2.2	2.2
Sweden.....	1.02	2.11	2.44	2.70	2.55	2.6	2.2
Norway.....	0.67	2.18	2.37	2.70	3.11	n.a.	3.2
Finland.....	0.46	1.19	1.71	1.58	2.13	n.a.	2.7
Germany.....	1.85	2.03	2.74	2.33	2.51	n.a.	n.a.
Netherlands.....	3.38	3.41	3.78	3.83	3.86	3.5	3.7
GROUP C							
Argentina.....	4.75	5.41	5.58	5.46	5.57	5.6	5.7
Chile.....	3.37	5.10	5.36	5.66	5.78	5.4	5.7
Uruguay.....	4.15	3.77	3.46	4.60	4.73	3.6	4.2
Yugoslavia.....	1.30	3.02	3.75	4.45	4.39	3.6	3.4
Greece.....	3.80	3.88	4.59	4.94	5.34	3.7	5.6
Italy.....	5.11	6.29	6.62	6.29	5.95	4.7	6.0
GROUP D							
Portugal.....	1.83	2.08	2.24	2.22	2.08	2.8	n.a.
Egypt.....	2.50	2.85	3.01	3.00	2.45	n.a.	2.2
India.....	0.61	0.79	0.78	0.80	0.80	0.8	0.8
Japan.....	0.39	0.73	0.68	0.64	0.60	0.3	1.1

<sup>a</sup> Malenbaum, *The World Wheat Economy*, Harvard University Press, 1953.

<sup>b</sup> F.A.O., Food Balance Sheets.

n.a. — not available.

Table 21

**CEREAL CONSUMPTION, SELECTED COUNTRIES**  
(lbs. per capita per annum)

	Country	Prewar	1947-48	1950-51	1953-54
GROUP A	Australia.....	220.9	214.4	216.6	205.6
	Canada.....	205.7	167.8	172.8	162.2
	U.S.A.....	196.9	179.4	166.2	157.5
	New Zealand.....	190.3	201.2	192.5	190.3
	U.K.....	207.8	242.8	218.7	201.2
	France.....	271.2	223.1	258.1	238.4
GROUP B	Switzerland.....	240.6	255.9	258.1	229.7
	Denmark.....	n.a.	n.a.	n.a.	n.a.
	Sweden.....	210.0	181.6	201.2	172.8
	Norway.....	260.3	264.7	253.7	216.6
	Finland.....	n.a.	n.a.	n.a.	n.a.
	Germany.....	247.2	275.6	220.9	214.4
GROUP C	Netherlands.....	234.1	220.9	220.9	201.2
	Argentina.....	231.9	275.6	242.8	218.7
	Chile.....	n.a.	n.a.	n.a.	n.a.
	Uruguay.....	185.9	210.0	205.6	n.a.
	Yugoslavia.....	498.7	385.0	380.6	413.4
	Greece.....	356.6	312.8	345.6	325.9
GROUP D	Italy.....	358.7	330.3	334.7	339.1
	Portugal.....	n.a.	251.6	277.8	n.a.
	Egypt.....	398.1	398.1	374.1	362.3
	India.....	140.0	1105.0	122.5	131.2
	Japan.....	61.2	70.0	98.4	100.6

SOURCE: *The State of Food and Agriculture 1955*, F.A.O., 1955.

along with the effect of domestic agricultural policies fostering the use of home-produced wheat supplies, it seems unlikely that any substantial increase in the volume of world trade in wheat can come from European importers. Much the same is true about countries in the second group. In the third group it is likely that, even though consumption of wheat is high and rising, a decline in consumption will come about as incomes rise and the standard of living improves. It is really only the last group which can make a substantial difference to the volume of wheat traded in the future.

The rate of increase in population in the countries in this fourth group is large and will continue to grow at a rapid rate over the next 25 years. There is a desperate struggle to improve their diets. If these countries are to make a substantial difference to world trade in wheat, they must be able to buy from abroad. The limiting factor in all of them is that foreign exchange is likely to be reserved for the purchase of manufactured goods which will be needed in the gradual process of industrialization. Where it is possible to expand food production within the country, this policy will be pursued with vigour. In the case of certain countries, however, such as Japan and the Philippines, resources for food production are very limited and population is growing rapidly.

The fact remains that over three-quarters of the world's population is in the group of countries which have rising per capita consumption of wheat. It seems reasonable to assume that although obstacles will remain in the way of rapid increases in consumption, the growth of population in these countries will exert an upward pressure on the volume of world trade in wheat. It is extremely difficult to determine the rate at which this pressure will be exerted. In the next few years the volume of world trade may decline somewhat. It has come down from the peak of 1,066 million bushels in 1951-52 to around 900 million bushels. The disappearance of the rice shortage and the benefits of new production programmes in underdeveloped areas may mean a further reduction in this. On the other hand, postwar conditions have established trends and promoted habits which will be hard to eliminate. In both South America and Japan bread is now much more common in the diet than in former years. Some effort is likely to be made by countries in this group to maintain a larger supply of wheat than was possible in prewar years.

The Far East seems likely to remain a net importer of cereals unless there is to be a substantial fall in per capita consumption. Even if all the production targets of countries like India are reached, per capita production of cereals in the area will reach only 90% of that which existed before the war. The size of the net import requirement is very uncertain, however, depending as it does on the success of production programmes and the level of human consumption which is maintained.

There appear to be opposing forces among the factors influencing the future level of world trade in wheat. The domestic policies of most importing countries are directed at increased self-sufficiency almost regardless of cost. While the rise in population might be expected to exert an upward influence on the volume of wheat traded, the trend in per capita consumption is downward, except in areas where poverty is the limiting factor. The assumption that there is an upward pressure on the volume of world trade depends for its validity upon the possibility of finding ways of removing some of that poverty.

To decide on a level of trade in wheat in the future, some judgment must be used on two counts. It is necessary to decide by how much self-sufficiency can increase, and to what extent poverty can be eliminated in the underdeveloped areas, so that they can overcome the increase in population and raise the per capita consumption of wheat. Consideration of these influences leads us to suggest a volume of trade which will move gradually upward from around 800 million bushels to about 950 million bushels. This would mean a level of world trade lower than that in recent years, but by the end of the 25-year period under consideration, the volume may reach a level somewhat above the average of the 1945-53 period. In this period the volume of trade was 912 million bushels.

To arrive at an export position for Canada, it is necessary to decide not only what the level of world trade will be, but also the share of the world market that Canada can obtain.

*(b) Canada's share in the world market for wheat*

The world's four major exporters, Canada, the United States, Australia and Argentina seem to be firmly established as the suppliers of about 80% of the volume of world trade in wheat. After both world wars there was a contraction in the importance of secondary exporters in the wheat market, and particularly in the position of the U.S.S.R. and the countries of eastern Europe. At the present time, even with the emergence of France and Turkey as substantial exporters, the major exporters supply around 80% of all the wheat entering world trade.

The growth of population, increasing consumption, and changes in the organization of agriculture within the U.S.S.R. and other eastern European countries make it seem improbable that they will export wheat in any great amount in the future. It may well be that the present need for imports in this group of countries is symptomatic of a longer term trend. Just as France seems to be emerging as an exporter in times of good harvests, and an importer in poor years, so the countries of eastern Europe seem to be moving toward a marginal export position which does not represent a serious effort to share in world exports.



The major competitors to the four most important exporters in the market at present are France and Turkey. Both countries are high-cost producers, and neither of them has a competitive advantage in quality. It seems unlikely that they can maintain an important position in the export market in the long run. It is hardly possible to arrive at any reasonable estimate of the number of countries which will export wheat in the future, or the extent of their participation. A review of past market conditions and a consideration of comparative cost conditions does suggest, however, that the major exporters are likely to maintain their dominant position and that they will supply about 80% of the total exports.

To decide what Canada's export prospects are, it is necessary to examine the relative competitive positions of the major exporters and to consider the factors which may affect their future positions. Each of them has some natural advantage in wheat production and can produce wheat in certain specific areas at low cost. In the postwar market the importance of the United States is very noticeable. The share of the total export market supplied by the United States was as high as 52% in 1946. Since the shortage of cereals has passed, the share of the market contributed by the United States has fallen. The recovery of production in Australia has increased her participation in the market, and Argentina has been showing signs of coming back into her prewar competitive position.

One of the striking features of the market pattern for wheat in the postwar period is that the emergence of the United States as the major world exporter did not come about at the expense of Canadian exports. In large measure it was due to the world shortage of grain supplies at a time when the only nation which could increase production was the United States. Unfortunately, the readjustment which has become necessary in the last few years has been made difficult by excessively good crops of wheat in most areas of the world. In attempting to reduce the surplus, the United States has been gaining marginal markets which otherwise might have come to Canada.

The main role of the United States in postwar markets, however, was to make up for the deficiencies in the domestic production of importing countries (including traditional rice-consuming countries) and to take up part of the share of the market which normally went to Australia and Argentina. Recovery of production in Europe, Asia, and in Argentina and Australia poses a question regarding the future role of the United States in the world wheat market.

The United States has three disadvantages in the wheat market which make it seem unlikely that the recent dominance of the market can continue. First, it does not export hard wheats which are in demand in Europe for mixing purposes; second, where currency restrictions influence purchasers, it is at a disadvantage unless it offers some special trade transaction; and

third, although capable of low-cost production, domestic policy brings about high-cost production with the result that exports have to be subsidized.

The present law governing wheat acreage in the United States makes 55 million acres a permanent minimum allotment. The acreage harvested in the 1954-55 year was 47.4 million acres, and it can be expected to remain about 50 million acres as long as the present law exists. The yield of wheat has been between 17 bushels and 19 bushels per acre in recent years. Per capita consumption of wheat as food in the United States has fallen steadily since 1900 (see Table 20). The result has been an almost constant rate of disappearance for human consumption despite the rise in population. The trend in the per capita consumption figure is likely to continue downward and to offset the rise in population. The need for wheat for human consumption within the United States will not, therefore, increase much in aggregate, if indeed it increases at all.

The wheat acreage in the United States has been reduced from the 1951-52 peak by 20 million acres (see Table 17). It is assumed in the United States itself that over the next ten years marketing quotas will be both rigorously enforced and tightened up. It is expected that by 1965 the acreage in wheat will be reduced to 45 million harvested acres, if any effort to reduce the extent of the surplus is to be made. In the meantime, outlets will have to be found for part of the current stockpile, plus some excesses over current consumption and export, particularly in the next five years.<sup>5</sup> Beyond 1965, the rise in meat consumption in the United States may make sufficient demand on the supply of feed grains to keep the acreage in wheat at the 45-million-acre level.

At present levels of domestic disappearance this would imply that the United States would have about 165 million bushels available for export, assuming yields remain at their present high level. This would represent about 17-20% of world trade in wheat, instead of the share of about 30% which the United States obtains at present. Should yields rise by another bushel per acre, the United States could have available for export some 200 million bushels, or from 22-25% of the expected world market.

In recent years Argentina has been making efforts to regain her position in the wheat market. As a non-dollar producer and as a producer of hard wheats, Argentina can provide competition for both the United States and Canada. Because part of the recent large share of the market going to the United States came from sources previously dependent on Argentina, such as Brazil, Italy and the United Kingdom, it is likely that a recovery of Argentinian production could mean a return to its prewar share of the market as the United States share of the market decreases.

<sup>5</sup> See J. D. Black and J. J. Bonnen, *A Balanced United States Agriculture in 1965*, Special Report No. 42, National Planning Association, April, 1956, p. 15.

Australian exports are made up of soft wheats and have not generally competed vigorously with Canadian wheats. Being near Asia, Australia may attempt to obtain a larger share of that market now that production is more normal. In Europe its competitive advantage consists in having a non-dollar wheat, but this is offset by the softness of the wheats exported. Active competition from Australia may affect Canada's share of any future expansion in the Asiatic market. It does not seem likely, however, to affect materially the share of the existing world market which Canada obtains.

In considering Canada's position among the major exporters, it is noticeable that, in the shifting pattern of trade experienced in the postwar years, the absolute share of the market going to Canada has not altered much. The surplus position of recent years has tended to reduce it slightly, and in the next few years this may continue to be the case, especially if the United States continues to offer special export conditions to obtain markets. Beyond the period of the surplus, however, there is little to suggest that Canada will not be able to obtain the same average share of the market as she has obtained on average over the period since 1920. This is 30% of the market.

*(c) Total demand for Canadian wheat*

The total demand for Canadian wheat is made up of four items, exports, wheat for human consumption, wheat for seed and wheat used as animal feed. From 1941-54, the average domestic disappearance was 156 million bushels, made up of 50 million bushels human consumption, 70 million bushels feed and 36 million bushels seed.

From 1930 to 1954 the disappearance of wheat for human food in Canada has fallen from 4.1 to 3.6 bushels per capita. Over the same period the United States experienced a fall from 3.8 to 3.2 bushels per capita. As incomes rise and other foods become more attractive, this trend can be expected to continue. It is likely that by 1980 the Canadian consumption will have fallen from the present 3.6 bushels to 2.8 bushels per capita. With a population of 26.7 million people expected at this date, the domestic requirements for human consumption would be 75 million bushels. The requirements for feed purposes depend very much on the world demand for wheat and the quality available from year to year. Wheat must compete with oats and barley in the feed market. There is little to suggest that more wheat will enter feeding channels as population increases. Most farmers do not deliberately set out to produce feed wheat. The wheat which is used for feed consists of the lower grades of a product intended for a food market. The average disappearance in the period 1941-54 of 70 million bushels is likely to be as good a guide as can be obtained to the disappearance for feed in the period being considered. Allowing a further 35 million bushels for seed, waste, and industrial use, this brings the maximum domestic disappearance to 180 million bushels. The increase



to this amount will be very gradual, being dependent entirely on increases in population modified by a declining per capita consumption. Total domestic disappearance, therefore, is likely to range from 150 to 180 million bushels between 1955 and 1980.

The total estimate of demand for Canadian wheat can be made within the limits suggested by the above analysis.

(a) In the short run assuming competition in reducing surplus stocks:

Exports .....	220 - 250 million bushels.
Domestic requirement .....	150 - 165 million bushels.
Total requirement .....	370 - 415 million bushels.

(b) Long-term demand (1980):

Exports .....	255 - 300 million bushels.
Domestic requirement .....	180 million bushels.
Total requirement .....	435 - 480 million bushels.

The average yield of wheat in Canada since 1941 has been 18.3 bushels per acre. If this yield is maintained in the future, the acreage required to meet the demand suggested would be

(a) in the short run, 20 - 23 million acres,

(b) in the long run, 24 - 26 million acres.

If, in the longer run period, the yield per acre reaches an average of 19 bushels per acre, the land in wheat required to meet the demand expected would be 23 - 25 million acres. It therefore seems unlikely that Canada will require more than 25 million acres in wheat, or much less than 20 million acres. Recently the acreage in wheat has ranged from 26.2 million acres in 1952-53 to 21.5 million acres in 1955-56.

## 2. Barley

Canadian production of barley before the war averaged about 85 million bushels. Recent levels of production have been three times this amount, and this has been produced on an acreage just over twice as large as that which existed in prewar years. Before the war exports averaged about 14% of the total crop, whereas the recent high level of exports has been about one-third of production.

Exports of barley before the war varied from year to year, but, on the average, they were about 12 million bushels. The United Kingdom provided the main market, with more variable outlets in Belgium, Germany and the Netherlands. The United States provided only a small market. During the war the only market outlet was the United States, and substantial quantities went there for feed purposes. Immediately after the war export restrictions were placed on barley in order to maintain an adequate supply for the Canadian market. Since 1948, however, the market has been well above any previous level (see Table 22).

Table 22

# EXPORTS OF CANADIAN BARLEY TO SELECTED AREAS (1940-55)

	Average total export mil. bu.	U.S. percentage	U.K. percentage	Other European percentage
1940-44.....	22.8	94.7	0.2	4.3
1945-49.....	10.6	67.3	—	32.0
1950-53.....	75.5	27.1	14.5	37.9
1953-54.....	90.0	41.0	21.8	14.9
1954-55.....	77.1	24.8	63.0	6.6

SOURCE: *Annual Report of the Canadian Wheat Board, 1954-55.*

The main markets have been in the United States, the United Kingdom and Japan. The market in the United States has been largely for malting barley, that in Japan for a food barley as a rice substitute, and that in the United Kingdom for feed barley.

The market for malting barley in the United States has been of post-war significance. The use of barley for malting in the United States has increased from 58 million bushels in 1940 to more than double that amount. As population grows and incomes rise, the demand will continue to increase. American producers of malting barley will undoubtedly attempt to meet the expanding demand. The competitive factor is quality, however, and the barleys being grown in western Canada at the moment compete favourably with any produced in the United States itself. There are some grounds for believing that this market is likely to remain strong for some time to come. At the moment it accounts for more than twice the level of the total exports of barley before the war. As this market is not influenced by large yields of feed grain, it has some stability to it. It seems significant that when the United States put restrictions on the amounts of coarse grains allowed in from other countries in 1954 the quota for barley was large enough to allow in the amount needed for malting.

Apart from this market for malting purposes, the export position of barley is not clear. Instability has been typical of the exports of feed barley. The level of exports has been affected by growing conditions in other countries and in Canada, by shifts in the pattern of livestock production, by the availability of foreign exchange, by tariffs and by other factors.

Outlets for feed barley have been in the traditional markets of prewar years, namely, the United Kingdom, Germany and the Netherlands, but the volume exported has been substantially greater. The United Kingdom has provided the strongest market recently, but exports to that country



are hardly likely to be maintained at recent high levels. At the moment, barley has to compete on the feed market with plentiful supplies of other feed grains including wheat. The only indication of future trends comes from the fact that the whole level of disappearance of feed grains has risen in the postwar world. On the other hand, production has increased substantially in both the importing and exporting countries, and the level of world exports of all feed grains is just about that of prewar years. The fact that corn from Argentina has been in short supply has helped to strengthen the feed market for barley. With the present pattern of trade Canada could expect a market in Europe for barley, but there is no assurance that the pattern will continue. As long as dollar currency is scarce there will be pressure in the United Kingdom and Europe to become more self-sufficient in feed supplies. One indication of this is the fact that before the war the United Kingdom imported two-thirds of the total supply of feed grains used. In 1954 only one-third was imported. If non-dollar corn had been available from Argentina, the exports of Canadian barley to the United Kingdom might have been negligible. It does not seem advisable to assume that a market for any substantial quantity of feed barley will be available in the longer run picture. It seems likely that a variable outlet will be available but that it will be rather small.

The market in Japan for barley was substantial for the three years 1951-53. The barley imported was used as a substitute for rice. To meet this market permanently, producers would have to grow special varieties of barley which would have limited outlets elsewhere. The extent to which the market could develop permanently is unknown. Competition in that area from the United States has been strong, and the pressed barley industry in Japan is still developing. Should the market develop in a more certain fashion than at present, it could provide an additional outlet. It would probably be a variable one, and would depend to a considerable extent on the availability of rice.

### 3. *Oats*

The volume of oats exported has never been important in relation to total production. Before the war the average export represented about 4% of production. In the period since 1950 exports have been nearer 12% of production and have averaged about 50 million bushels.

The market for oats in prewar days was largely in the United Kingdom. During the war the main outlet was in the United States, where considerable quantities were imported as feed (Table 23). Since the end of the war, the European market has assumed some importance, but the United States has remained the major importer.

Table 23

**EXPORTS OF CANADIAN OATS TO SELECTED AREAS**  
(1940-55)

	Average total export mil. bu.	U.S. percentage	U.K. percentage	Other European percentage
1940-44.....	45.5	95.5	2.4	1.0
1945-49.....	21.0	48.1	13.2	33.6
1950-53.....	59.8	89.8	0.9	9.3
1953-54.....	69.9	94.2	2.2	3.4
1954-55.....	21.6	68.5	11.5	19.6

SOURCE: *Annual Report of the Canadian Wheat Board, 1954-55.*

The demand in the United States has come from dairy producers in the New England States who prefer the Canadian grain for feeding. The extent to which this market can be counted on in a long-run context is unknown. Recent quota restrictions by the United States on oats, barley and rye came about because domestic feed supplies were surplus to requirements. This is likely to be the case for some years ahead. In the more distant period, much will depend on the level of production maintained within the United States. It is more than likely that that country will import oats from Canada at intermittent intervals, but that no reliable market can be counted on.

The export of oats to Europe has never been an important part of Canadian trade in agricultural products. There is no reason to expect that trade will develop in this area, but some small and variable export outlets are likely to be available, as they have been in the past. Trade with the United Kingdom in oats has never reached its prewar dimensions. In the programme of self-sufficiency being followed in the United Kingdom, the domestic production of oats plays a large part. Only a small portion of imports of coarse grains into the United Kingdom consists of oats, and Australia has been the main supplier. There is a reluctance to spend dollars on a feed which can be obtained elsewhere for sterling, and, as long as currency difficulties exist, this reluctance is likely to persist.

#### 4. *Livestock*

##### (a) *Hogs*

The export of pork products from Canada in 1935-39 represented 40% of domestic consumption. In 1955 it was only 10%. Besides this change in emphasis, there has been a change in market outlet from the United Kingdom to the United States.

In the prewar period the United Kingdom took almost all the product exported. During the war special contracts were signed with the United

Kingdom government, and large quantities were shipped to that country until 1948. Special attention was given to the production of a lean hog to meet the requirements of the British market for Wiltshire sides. In this period, with an assured market, the hog producers increased the total volume produced very substantially. Since that date the export market has been limited to special cuts imported by the United States.

The situation in the next few years in respect to overseas markets for the Canadian hog industry is uncertain. There has been thought of re-entry into the British market. The contracts with Denmark entered into by Britain expired in October 1956 and the 10% tariff on bacon entering the country applied after that date to Danish bacon. This does not apply to Canadian bacon because of Imperial preference. It is for this reason that there has been conjecture over possibilities of this market re-opening to Canadian bacon. Two things make this seem unlikely. First, Britain will not be eager to commit herself to the purchase of substantial quantities of dollar meats in the near future. Unless there is a strong possibility of convertibility, there is little likelihood that this market will develop. Second, domestic consumption in Canada is at a high level. The British market is a specialized one, and to maintain it would require attention to quality production. Unless some certainty was attached to the length of the period over which that market would be available, Canadian hog producers would not be likely to undertake either the expansion which would be required or the quality improvement which would be necessary. The competitive position of Canada in the near future might make it possible to sell under Denmark, provided that the 10% duty on the Danish product continues. But this is so because of the present surplus of feed grains, and not because of any long-term competitive advantage. For both of these reasons, the chance of the British market being available as an export outlet does not seem great.

The market in the United States has developed in the postwar years for two main reasons. First, the lean hog produced in Canada provides specialty cuts which are not available from the corn-fed hog produced in the United States. Second, the price spread between cuts makes it possible for Canadian hams and backs to sell at lower prices in the United States than does the domestic product.

It is often stated that because the United States has a growing population and a high per capita consumption of meat products there will be a market outlet in that country for a considerable volume of Canadian pork. Against the possibility of a rise in the market must be set the fact that the hog industry in the United States is very efficient, that leaner type hogs are being developed, and that the competition from the domestic producer could result in quota restrictions on shipments of hog meats. Over the long run, therefore, the chance of a permanent export to the United States, in any sizable quantity, does not seem to be something which can be confidently expected.

For some time to come, it seems likely that the present pattern of trade will continue. The greater part of total production will be consumed in the domestic market, and a small export of specialty cuts will probably go to the United States (see Table 24 for pattern of trade in recent times).

(b) *Beef*

Relative to the previous volume of hog exports, beef exports have never been large. Canada's comparative advantage has been grain-fed products and Canadian beef has not competed easily in the world market. Before the war exports represented about 15% of domestic consumption and ranged around 90 million pounds. In 1955 they were about one-fifth of this level and represented only 2% of domestic consumption.

Future exports of beef are not likely to be large. Some export to the United States will occur at intervals as supplies available in the two countries fluctuate and consumers react to price changes. The volume is not likely, however, to be significant. It seems safe to assume that domestic consumption will be the largest factor in the beef market in the future, as it has been in the past. Indeed it is more than possible that, in occasional years, Canada could be a net importer of beef.

Table 24

## EXPORTS OF MEAT PRODUCTS FROM CANADA

(1930-54)

(a) **Hogs**

	Export dressed wt. in lbs.	Total supply	Exports as percentage of production	U.K. percentage of market	U.S. percentage of market
1930-34.....	57	855	7	90	3
1935-39.....	180	662	27	92	4
1940-44.....	536	1041	52	97	—
1945-49.....	264	986	27	93	—
1950-54.....	61	984	6	23	60

(b) **Beef**

1930-34.....	8	668	1	50	16
1935-39.....	11	642	2	41	22
1940-44.....	30	781	4	65	5
1945-49.....	125	979	13	60	28
1950-54.....	61	873	7	26	71

SOURCE: D.B.S., *Livestock and Livestock Product Statistics*.

### III. Imports of Agricultural Products

Canada has tended to reserve the domestic market for the domestic producer of agricultural products in all cases where products can be produced in Canada without excessive protection against cheaper food products



from other countries. This has been the case even though a substantial part of total imports has been food. The major part of food imports has been made up of tropical or semi-tropical products. Plantation crops such as tea, coffee and rubber have accounted for almost one-third of agricultural imports in recent years. Fruits have accounted for almost another third, and raw sugar and cotton for about one-third. The main products which Canada both grows and imports are fruits and vegetables, corn, and soybeans. Only about one-fifth, by value, of agricultural imports have been products grown in Canada.

The farm value of agricultural imports is small in relation to the total value of agricultural production. Imports are important only in the case of a relatively few items. Among the fruits, Canada imports relatively large quantities of apricots, plums, prunes and grapes. In addition there are substantial imports of citrus fruits, bananas and pineapples, which are not produced in Canada. Imports of tobacco, which were formerly quite large, both absolutely and as a percentage of Canadian production, now represent only a small percentage. Imports of wool have been rising and domestic production has been falling; at present imports are about 85% of domestic requirements.

It has generally been true that Canadian imports of agricultural products have fallen into three classes. The first, and clearly the most important, is the group of products which cannot be grown in Canada at all, except by using highly artificial and costly methods. The second is composed largely of products which are produced in insufficient amount in Canada, owing to limitations of physical conditions, both within the season of Canadian production and outside it. The third is composed of products of which Canada is the major supplier but which certain areas, such as the West Coast region, can import from the United States more cheaply than they can bring them in from other areas of Canada.

Canada imports about five times as much fruit and vegetables from the United States as she exports to that country. If citrus fruits, grapes and canned fruit are excluded from consideration, the value of imports is about two and one half times that of exports. Imports of fresh fruit and vegetables from the United States occur throughout the year. Even in their own marketing season Canadians continue to buy some fruits and vegetables from the United States. In the last few years about 43% of the total imports of competitive fresh fruits entered during the Canadian marketing season. About 30% of the import of fresh vegetables which can be grown in Canada took place in the Canadian marketing season.<sup>6</sup>

Imports of livestock and livestock products have never amounted to a significant percentage of total production. Some beef and poultry meat is

<sup>6</sup> A. E. Richards, "Tariffs and the Factors Involved in Formulating Tariff Policies, with particular reference to the Fruit Industry", *The Economic Annalist*, Vol. XXIV, No. 2, 1954, No. 6.

imported in British Columbia from Washington, and such regional importations occur in almost all products except the highly perishable ones like milk and eggs.

It seems likely, therefore, that increases in the domestic demand for food can be reasonably interpreted as expansions in the requirements from domestic producers, except in the case of those products which have traditionally been imported, either regionally or nationally. No section of the livestock producers would take kindly to the large-scale importation of livestock or livestock products. Should periods of temporary scarcity arise, in which imports of livestock products materialize, there is most likely to be a concerted effort on the part of the domestic producer to expand output, and, if this should require time, protection may be called for to prevent imports from becoming established as part of the supply in the interval.

Domestic self-sufficiency is not a necessary goal in itself. Canadian farmers, however, have made Canada self-sufficient in all the major food items which can be grown in Canada. They have received some protection in the production of sugar beets and dairy products, but generally, food has been produced in Canada as cheaply as it can be brought into Canada.

The indications for the future are that people will require substantial increases in meats, poultry, eggs, fruit and vegetables. No sudden upsurge in any of these is expected, because they will be the result of population growth and gradually rising per capita incomes. It therefore seems proper to assume that attempts will be made to maintain the pattern established over a long period of time; namely, that domestic producers can produce domestic requirements, and that they will attempt to do so competitively with alternative supplies. There is one difference, however, between past and future conditions. In meat production Canada has tended toward the position of a net exporter. In the latter part of the 25-year period with which this study is concerned Canada may find it necessary, in particular years, to import beef to meet the demands of the domestic market.

There is no evidence in the past pattern of trade in agricultural products, however, which would suggest that part of the future demand for livestock and livestock products will be met permanently from imports. It is, therefore necessary to consider what effects would result from the changes in resource allocation required to bring forth the meat and poultry products which are likely to be in demand. It is true that some small part of these supplies will be imported from the United States in regions where the supply can come across the border more cheaply than it can be shipped from other parts of Canada. This will be of little significance, however, in the total production picture. A consideration of the future agricultural production which starts from the assumption that the domestic producer will be called on to meet domestic demand in all products in which Canada is at the moment self-sufficient, or on an export basis, is unlikely to be far from the actual trend of events.

## CANADA'S LAND RESOURCES

### *I. The Pattern of Land Use*

The total land area of Canada is 2,313 million acres, of which only 174 million acres, or about 7.5%, is in farms.<sup>1</sup> The settled region of Canada lies close to the International Boundary. One-half of the population lives within 100 miles of the United States boundary and about 90% within 200 miles. The strip of settled area is not continuous, as it is broken into various segments by wide rocky stretches, and each segment is distinctive in its agricultural potentialities.

Land occupied for farming increased from 63 million acres in 1901 to 174 million acres in 1951. Eastern Canada was occupied to the fullest extent by 1921 and since then the area in farms has declined.<sup>2</sup> In Western

Table 25

### DEVELOPMENT OF OCCUPIED LAND (million acres)

	Eastern Canada	Western Canada	All Canada
1901.....	45.5	16.9	63.4
1911.....	48.9	60.1	109.0
1921.....	50.2	90.7	140.9
1931.....	49.8	113.3	163.1
1941.....	49.5	124.1	173.6
1951.....	45.4	128.6	174.0

N.B. The figures produced in this table are those recorded at census dates and reductions or additions between census periods are, therefore, net of changes in the opposite direction.

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

<sup>1</sup> This includes Newfoundland, the Yukon, and the Northwest Territories.

<sup>2</sup> In this chapter eastern Canada means all provinces east of Manitoba and western Canada means all provinces west of Ontario.

Canada land settlement took place at a rapid rate until 1931. Since then the rate of settlement has been rapidly decreasing. The pattern of land occupation is brought out in Table 25. Almost 100 million acres were brought into farming in the first 30 years of this century. Since then only 11 million acres have been added.

Much of the land in farms is not cultivated; large areas are still in trees or swamps, or are too stony for farming. Of the total area occupied for farming only 55.7% was improved in 1951.<sup>3</sup> This means that nearly half the occupied land has not been cultivated and, if it is used at all, it is used in its natural state as rough grazing land or as woodlots. Much of this land will remain in an unimproved state because it is unsuited to any form of cultivation. The proportion of occupied land which is improved increased from 47.4% in 1901 to 55.7% in 1951. The proportion of occupied land which is improved in the regions of Canada ranges from as low as 30% in the Maritimes to almost 61% in Ontario. In both of these regions the proportion has remained fairly constant over the last 50 years. In Quebec it has remained around 50%, in British Columbia it has moved up gradually from 33% to 43%; and in the Prairies it has increased from just under 40% to around 58%. It is evident that not only is all new settlement occurring in the Prairies and in British Columbia, but that any addition to improved land from land already occupied is coming from that region also.

### 1. *Eastern Canada*

The unimproved land in farms in eastern Canada is unlikely to be cultivated in any way in the future. About 14 million acres of it is in trees. This is permanent forest land and will not be cleared for farming purposes. The remainder of the unimproved land amounts to 7.6 million acres. The decline in this area in recent years is a consequence of farm abandonment. The trends in land use in eastern Canada are brought out in Table 26.

Table 26

## TRENDS IN LAND USE, 1901-51, EASTERN CANADA (million acres)

	Occupied land	Improved land	Woodland	Other unimproved
1901.....	45.5	24.1	16.0	6.5
1911.....	48.9	25.2	14.7	8.8
1921.....	50.2	25.4	16.4	8.3
1931.....	49.8	25.2	16.0	8.6
1941.....	49.5	25.2	14.5	9.7
1951.....	45.4	23.9	14.0	7.6

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

<sup>3</sup> Throughout this discussion the term "improved land" is applied to land which has been "once subject to ploughing".



The land which is unimproved and not in trees is of limited value as rough grazing land. Much of it lacks good drainage, or is rocky or inaccessible for cultivation. Whatever land development takes place in the future is likely to be more than counteracted by the loss to agriculture through the abandonment for farming of land unsuited to mechanization and through the loss of productive farm lands to industrial uses. So far, the loss of land to urban uses has not made any substantial difference to the area in farms. It has taken place mainly in Ontario. The loss of this land to farming is a process which is likely to continue as urbanization continues. The land lost was generally being used fairly intensively for farm purposes because of its proximity to population centres.

The improved land area in eastern Canada is used largely for crops and pasture and the pattern of use shows a considerable stability. The reduction in land in farms in the 1941-51 period reduced the area in crops, but the area in pasture rose slightly. The use of improved land in eastern Canada can be seen from Table 27.

Table 27

### USE OF IMPROVED LAND, 1901-51, EASTERN CANADA (million acres)

	Crops	Summer fallow	Pasture	Totals <sup>a</sup>
1901.....	16.3	—	—	24.1
1911.....	17.8	0.1	—	25.3
1921.....	17.4	0.7	6.8	25.4
1931.....	17.8	0.4	6.3	25.2
1941.....	17.3	0.4	6.5	25.2
1951.....	16.1	0.4	6.6	23.9

<sup>a</sup> Includes other improved land such as barnyards, lanes, roads, etc. on farms.

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

In 1951 slightly less land was in crops than in 1901, and, if more farms are abandoned, the area in cropland may fall further below the level at the beginning of the century. Between 1941 and 1951 a total of 4.1 million acres went out of agriculture in eastern Canada. Of this total, 2.6 million acres was other unimproved land, 0.5 million acres was woodland and 1.3 million acres was improved. Of the reduction of 1.3 million acres improved, 1.2 million acres was cropland, and the rest consisted of farmland occupied by buildings and roads around farms.

More than three-quarters of the net withdrawal of land from agriculture in eastern Canada has been unimproved land (that is, woodland plus other unimproved land). In 1951 all unimproved land represented 48% of the occupied area in Eastern Canada. The farms which have been withdrawn must, therefore, have been those on which there was a much higher proportion of unimproved land. The stony and hilly farms with proportionately large areas of unimproved land would be most difficult to mechanize and.

especially in Quebec and the Maritimes, the statistical evidence suggests that it is farms which are physically unsuited to power farming which have been withdrawn. If this is the case, then, as the amount of mechanization increases, unimproved land is likely to move out of farming at least as quickly as in the past. In the 1941-51 period the amount of land withdrawn from agriculture in eastern Canada was sufficient to counteract any tendency to occupy new land. This trend, also, will most likely continue.

## 2. *Western Canada*

In contrast to the eastern section of Canada, the area in farms in western Canada continues to grow. The trends in land use in western Canada are indicated in Table 28.

Table 28

### TRENDS IN LAND USE, 1901-51, WESTERN CANADA<sup>a</sup> (million acres)

	Occupied land	Improved land	Woodland	Other
1901.....	16.9	6.1	0.8	10.0
1911.....	60.1	23.5	2.8	33.9
1921.....	90.7	45.4	7.4	38.0
1931.....	113.3	60.5	10.6	42.2
1941.....	124.1	66.4	7.8	49.9
1951.....	128.6	72.9	8.8	46.8

<sup>a</sup> This term includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

The net rate of occupation has been considerably slower than the net rate of improvement. Since 1931 land which was unimproved but occupied has been cultivated for cropping, and this, in addition to the consolidation of farms, has enlarged farm businesses without settling new land areas (see Table 29).

Table 29

### THE RATE OF LAND DEVELOPMENT IN WESTERN CANADA NET ADDITIONS TO LAND BETWEEN CENSUS PERIODS (million acres)

	Occupied land	Improved land	Unimproved land
1901-11.....	43.2	17.3	25.9
1911-21.....	30.6	22.0	8.7
1921-31.....	22.6	15.1	7.4
1931-41.....	10.8	5.9	4.9
1941-51.....	4.5	6.6	-2.1

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

It can be seen from Table 28 that between 1941 and 1951 the net addition of improved land was half as much again as the addition of occupied land. It is very unlikely that more than 50% of the net addition to occupied land would be improved within the ten-year period. (This is especially true as most of the new settlement took place between 1946 and 1951.) If 50% of it was improved, however, 2.3 million acres of the total addition of improved land would have come from this source. There would still be 4.3 million acres of new improved land which must have come from the improvement of land occupied before 1941. This would seem to suggest that in this period more has been contributed to agricultural production by further development within existing farms than from new land settlement.

The area of improved land in western Canada is used differently than in eastern Canada. In the Prairie region the practice of summer fallowing<sup>4</sup> is common. The purpose of summer fallowing is to conserve moisture in the drier regions of the Prairies and to aid in the control of weeds. The practice has made it possible to farm areas in which rainfall had previously been a restricting factor. The type of farming had to be extensive, however, because each year a substantial part of each farm had to be in summer fallow. The uses of land in western Canada are shown, at census dates, in Table 30.

Table 30

### USE OF IMPROVED LAND 1901-51, WESTERN CANADA (million acres)

	Crops	Summer fallow	Pasture	Total
1901.....	3.8	—	—	6.1
1911.....	17.9	2.3	—	23.5
1921.....	32.6	11.3	0.8	45.4
1931.....	40.5	16.6	1.7	60.5
1941.....	39.0	23.1	2.0	66.4
1951.....	46.1	21.6	3.4	72.9

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

The new crop land of the 1941-51 period came into production in the postwar period and was largely the result of the improvement of land already in occupied farms. Between 1941 and 1951, 4.5 million acres of new land were occupied. If it is assumed that this land was already 50% cleared and ready for production by 1951 (the average for all occupied land was 55.6%), the addition of improved land from new occupation would amount to 2.3 million acres. This means that 4.3 million acres

<sup>4</sup> Land which is maintained in a cultivated state throughout all or most of the growing season without producing a crop.

already occupied were cleared, drained or otherwise improved, so that they could be cropped.

The trends in land use in both eastern and western Canada give substantial support to the suggestion that Canadian agriculture is unlikely to expand much into new farming areas. The rate at which new lands are occupied in the West has been falling in every ten-year period since 1911. Occupied land is being improved and cropped at a faster rate than new settlement is taking place. Similarly, in eastern Canada, where new settlement ceased to be of importance after 1921, unproductive land is being vacated and fuller use is being made of the remainder. To arrive at some judgment on future trends in land use it is necessary to consider what area of land is available for land settlement and what conditions would give rise to its occupation.

## *II. The Possibilities of Expansion into Undeveloped Areas*

In eastern Canada land available for new development lies principally in northern Ontario and in northern Quebec. Some suitable land is thought to exist in the five northern counties of New Brunswick, although not much of it is expected to become very good farmland. Within the 25 years with which this study is concerned it seems improbable that any of this will be used for agricultural production.<sup>5</sup>

In northern Ontario the growing season is extremely short and the winter is severe. The rainfall is abundantly sufficient, but the soils are inferior to the better soils in the Prairie Provinces and southern Ontario. If they were cleared of bush cover and peat, they would still require some years of cultivation before they could become productive. Much the same is true of the land available in northern Quebec. In the two provinces it is unlikely that the total area available for agricultural use can amount to more than about 10 million acres.<sup>6</sup>

Very little new settlement has taken place in recent years. In the whole of eastern Canada the rate of new settlement has been considerably slower than the rate of farm abandonment in the occupied areas.<sup>7</sup> Many difficulties lie in the way of establishing new farms in the areas which are suitable for agricultural settlement. The shortness of the growing season puts severe limits on the forms of production which can be pursued. Much of the better land is in long narrow strips paralleling the many rivers traversing the region from north to south. This adds to the difficulties of settlement. In addition, there is the difficulty of establishing an economic

<sup>5</sup> See G. P. Boucher "Land Settlement Possibilities in Eastern Canada", *The Economic Annalist*, Vol. XVI, No. 2, May 1956.

<sup>6</sup> This statement is based on a considered judgment of the estimates made in the reference of footnote 5 and in other literature on postwar settlement possibilities in Canada.

<sup>7</sup> See Part II of this report for a fuller account of this process.



unit for settlement. The settler of recent times is not eager to be a pioneer. If these areas are to be settled, schools and other community buildings must be provided, road systems must be laid out, and drainage systems completed. The area must be divided into farms of a reasonable size, and these should provide for expansion as the need arises. Part of the land must be cleared prior to settlement, and some shelter must be provided for the settler and his family. Before any of this development could take place, information would be required on climatic and soil conditions and on the economic possibilities of each particular region. This involves costly surveys, the cost of which would have to be met in all probability by provincial governments.

The total costs involved in this process cannot be estimated, but it is certain that they are extremely high. The past history of land settlement in eastern Canada is not good. In Ontario, 72% of the land settled between 1912 and 1937 was abandoned or resettled. In some cases the land was unfit for settlement and in others the settlers could not or would not perform their settlement duties. Until 1936 the provincial government lent money to individual settlers. Loans for settlement were stopped in 1936, although settlers may still obtain loans through the Canadian Farm Loan Board. In Quebec, encouragement has been given in the form of subsistence to settlers during the first few years after the acquisition of a lot. Even so, from 1910 to 1940, more than 50% of the area settled was abandoned or had to be resettled.

The policy of new settlement in Quebec is being continued and is likely to persist. In Ontario the government may become concerned at some time with the rehabilitation of abandoned lands, but it gives no indication of preparing for the task of planning, surveying and laying out farms in northern Ontario, nor is it considering the outlay necessary to open up the area with roads, schools and other social services.

In western Canada the possibilities of new settlement are considerably greater. The land available, however, lies mainly in the northern wooded areas of the Prairie Provinces, in the Peace River District, and in the interior of British Columbia. The areas available have certain characteristics in common. They are located in the northeast and northwest parts of Manitoba, the northeast, northcentral and northwest parts of the settled areas of Saskatchewan, and the northeast, west and Peace River blocks in Alberta. In British Columbia, the area suited to settlement lies mainly in the Prince George to Prince Rupert region of the interior and in the Peace River District. Each area is similar in climate and physical and economic conditions, even though it has its own peculiar characteristics.

All these areas possess certain economic obstructions to settlement of which the more important are physical isolation, poor comparative advantage and difficulties in meeting the costs of settlement. In all cases most of the land is a considerable distance from market, and the land which is best

suited to farming is in small compact areas interspersed with a high percentage of poor land. About half the recently settled areas of Saskatchewan, Alberta and British Columbia are within 15 miles of a railway. Many of the rest are at least 50 miles from a railway and are not served with all-weather roads. The cost of construction of roads through these areas is extremely high and must be met by the province and the municipality. In addition, settlers in these regions are isolated from medical services, educational facilities and all of the other community services which the more settled areas possess. Because the areas suited to settlement are dispersed, such services are extremely costly to the municipality.

Even when the high costs of transportation are excluded, it is found that these areas are high-cost producers of agricultural products. The short growing season and the cold winters limit the range of crops which can be grown. There are few crops other than legume seeds which can be produced competitively with areas nearer markets.

The provision of capital to establish a business large enough to keep a family is a persistent problem for the pioneer farmer. Capital is needed to develop the farms and to shorten the period which is necessary to establish an income. New areas are usually settled by those who have very little capital. This is often the reason for moving into an undeveloped area. In addition, private lending agencies are not interested in making loans in untried areas, and public agencies usually follow a policy of waiting until an area is developed before they will make loans. The experience of recent settlers who acquired a homestead, or made a nominal purchase from the Crown, has been very discouraging. At first settlement, there were open patches of grassland surrounded by sparse growth of trees. Settlers managed to break about 9 to 18 acres of this per year. As they moved outward into the heavier bush and tree land, the rate of clearing fell to only four acres per year. At this rate it would take 25 years to establish a unit large enough to provide a minimum standard of life.<sup>8</sup> It is certain that, if land of this nature is to be settled in the future, large-scale clearing by machine will be necessary. This will mean that settlement schemes will require the active support of the provincial governments, as it is unlikely to be the kind of investment which would appeal to private interests.

The extent of the area suited to future settlement varies with the criteria used in determining suitability. Past experience indicates that an area must have the physical and climatic conditions necessary to the production of commodities which can find markets without too great difficulty. Land must be suitable for quick clearance and be in areas suited to providing about 320 acres per settler. Even on this basis it is estimated that it would take settlers 25 years to pay off the capital costs of improve-

<sup>8</sup> See C. Spence, "Land Settlement in Western Canada", *The Economic Annalist*, Vol. XVI, No. 2, 1946, pp. 33-42.

ments, stock and equipment. Along with farm development, community development must occur. Roads, schools, health services, as well as the normal commercial facilities such as banks and stores, must be within travelling distance. The demand for such services will become stronger and stronger in the future. If new areas are to be settled, it will not be by solitary pioneers content to live in isolation. Settlement schemes will have to be organized and developed at considerable public expense. It is worthwhile, therefore, to examine the extent and location of lands available for settlement and to consider the policies of provincial governments toward the problems involved.

In Manitoba, the land available for immediate settlement amounts to about one million acres.<sup>9</sup> This land is generally in settled districts provided with roads, schools and other municipal facilities. There are another 1.5 million acres of land which are not available for immediate settlement but which might be used for agriculture if the more inaccessible regions of the province were opened up. In the northern clay belt region, located along the Hudson Bay Railway, there are three million acres which might, one day, be used for agricultural development. This area is subject to frost hazard, however, and, at the moment, consideration of its potential has not gone further than the establishment of an experimental station in the region to determine what crops can be grown there. It would seem unlikely that in the space of 25 years much more than the one million acres in settled districts is likely to come into farming.

In Saskatchewan, there is only one large block of land which could be made available for settlement. This lies in the lower Saskatchewan Valley. It is subject to flooding, and a large dyking and drainage project would be necessary. It is estimated that this area amounts to about one million acres. In the northern region, between the present boundary of settlement and the Precambrian Shield, there are 30 million acres or so of forest land, of which only about 0.5 million acres could be cleared for farming purposes.<sup>10</sup>

The dyking and drainage of the lower Saskatchewan Valley would entail high costs and is unlikely to be undertaken except under conditions of extreme land scarcity. The developing and settling of the 0.5 million acres in the forest zone will be slow.

Most of the land available in the Prairie region, therefore, lies in the Province of Alberta. New lands for settlement are located almost entirely in the fringe areas of northern and western Alberta. The soils are under tree cover which varies from a light to a heavy growth. With modern equipment, the clearing and breaking of land might be accomplished for

<sup>9</sup> Estimate supplied to Commission Staff by the Lands Branch, Department of Mines and Natural Resources, Government of Manitoba.

<sup>10</sup> Estimate supplied to Commission Staff by the Department of Soil Science, University of Saskatchewan.



\$20 to \$40 per acre.<sup>11</sup> The area which will be developed over the next 25 years is a matter of conjecture. If the costs of clearing and breaking, and the difficulties of establishing social services in the area are kept in mind, it is very unlikely that settlement can occur as fast as it has in the recent past. Not more than three million acres are likely to be cleared and occupied in the north and west of Alberta between now and 1980.<sup>12</sup> The amount of unoccupied land in areas already settled for farming is largely confined to land unsuited to arable use. In total, the amount of this which may be taken up for grazing purposes seems to be about 1.5 million acres.<sup>13</sup>

In British Columbia the greater part of the land available for settlement lies in the Peace River District and the central interior section of the province. While there is a considerable difference of opinion regarding the actual amount of land in these areas which is really arable, it is obvious that it is quite substantial. One recent estimate based upon soil survey results places the potential area in the Peace River District at two million acres and that in central British Columbia at one million acres.<sup>14</sup> Whatever the total may be, however, it is unlikely that more than 300 or 400 thousand acres of it will be added to the improved land area by 1980.<sup>15</sup>

In all of western Canada the total amount of new land which is suitable for agricultural occupation over the next 25 years would seem to be about 7.5 million acres, and, for some two million of this, some extremely costly measures of drainage or clearing make development unlikely.

### III. *Government Policies toward Settlement*

Since 1931, when land resources were transferred to the provinces, the right to homestead land has been considerably restricted.

In Manitoba a Land Board was set up to supervise land settlement. The need to provide municipal facilities prior to, or along with, settlement brought about a policy of "Land Settlement Projects". Under this policy, settlement is taking place in blocks on land purchased from the government. If clearing, breaking, and drainage are done by the govern-

<sup>11</sup> Statement in *Alberta's Economic Prospects*, Submission of the Province of Alberta to Royal Commission on Canada's Economic Prospects, p. 33.

<sup>12</sup> It is suggested in *Alberta's Economic Prospects* that 2.7 million acres will be occupied.

<sup>13</sup> Op. cit., p. 34.

<sup>14</sup> See "Inventory of Agriculture in British Columbia" in Ninth British Columbia Natural Resources Conference, February, 1946.

<sup>15</sup> The brief presented to this Royal Commission by the Province of British Columbia contains the statement on p. 57: "There are at least 500,000 acres of highly productive arable farm lands, not presently in production, that would be utilized to maintain the present limited degree of Provincial self-sufficiency in agricultural products." (This was assuming some government aid to land development but not substantial subsidized schemes.)



ment, the cost is added to the sale price of the land. At the present time there are only three projects, covering a potential of 186,500 acres, which are only about half settled. An additional project may soon be completed which will make another 100,000 acres available. The government of Manitoba has spent about \$1.4 million on these schemes and has received \$1 million from land sales.<sup>16</sup> The cost of drains, roads, and bridges in the settlement areas is estimated to have run to more than \$7 per acre on all land within the area.<sup>17</sup>

In Saskatchewan, land is rented to settlers on a 33-year lease. Rent is based on productivity but must not exceed one-sixth of the crop. The lessee must pay all local taxes and grazing fees according to carrying capacity. The government clears the first 50 acres; additional clearing costs may be charged against the rent by the lessee, but they must not amount to more than \$25 per acre.

Experience with this leasing system has indicated certain weaknesses. Not enough attention was paid to the building of roads, and no planning between municipalities and the Lands Branch of the Department of Agriculture took place. The result has been that lessees have found themselves cut off from markets. In addition, clearing has been slow and difficult, and drainage problems have been encountered. The new farmers have tended to lease land without sufficient capital to improve or develop it further.<sup>18</sup>

In Alberta, a policy not unlike that of Saskatchewan is being followed. Lessees are allowed to take up land only in areas which have been surveyed and classified as suited to settlement. The lessee is required to continue land clearance after occupation and to pay a one-eighth share of the crop as rent on uncleared land. Clear title is given to the land after ten years, or after five years on the payment of a nominal sum to the provincial government.

In British Columbia the Land Act provides for the pre-emption by a qualified person of a tract of land not exceeding 160 acres in extent. Certain duties have to be met before full title of ownership can be obtained. The government may assist in clearing land, but there is no provision for actively encouraging land settlement in government schemes.

It is evident that the rate at which new areas are being occupied is being tempered by government insistence on future settlement being planned, directed, and supervised. The heavy relief expenditures of the 1930's created a strong prejudice in official circles against settlement which might result in the settler's becoming a public charge. In terms of practical

<sup>16</sup> This cost is for development only and does not include the cost of social services.

<sup>17</sup> *Annual Report of Department of Mines and Natural Resources, 1955*, Government of Manitoba, p. 29.

<sup>18</sup> *Annual Report of Department of Agriculture, Government of Saskatchewan, 1955*, p. 132.

policy this means undertaking detailed soil and other surveys before opening a new region for settlement.

In view of the restricted amount of new settlement which seems to be implied in the evidence presented here of the land available for settlement and the encouragement given to new settlers, it seems likely that in the future more emphasis will be put on ways of increasing output from the land now occupied for farming. The ways in which this might come about are our next consideration.

#### *IV. The Possibilities of Increased Intensity of Land Use*

There are many ways in which land use can be intensified. In the first chapter the process of intensification of land use was sketched in a general way. It is now necessary to consider what forms intensification may take and to what extent each form may contribute to future increases in production.

The most elementary way to increase land productivity is to cultivate a greater area of each farm. This has been happening in recent times, but, just as the extension of new settlement must reach limits beyond which the cost of alternatives is lower, so too there are economic limits to the extension of cultivation. There are limits beyond which farmers will find that further measures to bring new land into crop production are more costly than applying the same amount of capital to the area already being cultivated.

##### *1. Land Improvement*

The improvement of land out of the existing area of occupied land is a process which has been more prominent in the areas of later settlement than in the areas which have been farmed for 50 years or more. The trend towards a fuller use of the occupied acreage in western Canada can be seen from Table 31.

Table 31

#### PERCENTAGE OF OCCUPIED LAND RECORDED AS IMPROVED 1901-51

	Prairie region	British Columbia
1901.....	5.6	33.3
1911.....	23.0	20.0
1921.....	44.9	17.0
1931.....	54.5	20.0
1941.....	54.5	22.5
1951.....	57.9	24.4

SOURCE: D.B.S., Reference Paper No. 25, Pt. III, *Trends in Canadian Agriculture*.

In the Prairie region the improvement is taking place only in the northern regions where rainfall is higher. In the drier areas land improvement is unlikely to make any significant contribution to future land use. The maximum contribution of further improvement of the existing occupied land is likely to be reached when the proportion improved reaches an average for the Prairie region of 61%. This would mean an addition of about 3.8 million acres to the area of improved land.<sup>10</sup>

In British Columbia, the contribution resulting from the use of this method is likely to be slight. Even if the improved land area can be increased within the next 25 years to 30% of the occupied area, this would mean an addition to improved acreage of only 0.3 million acres. In eastern Canada, further improvement is unlikely. The proportion of the occupied area which is improved may rise as time goes on, but the reason is likely to be that the land being abandoned is the kind most difficult to improve.

The net addition from further land improvement to the existing acreage of occupied land in Canada is, therefore, not likely to be more than about four million acres. This, however, is a greater contribution to future production than is likely to arise from new occupation. If the total amount of new occupation amounts to six million acres in western Canada over the next 25 years, it will be extending the margin of occupation into most of the land which is stated to be suitable by those familiar with the land resources. If the new settlers are able to clear and improve 50% of this new land, it will add three million acres to the improved land area.

## 2. *Reduction in Summer Fallow*

In the Prairie region of Canada there is an area of cropland, amounting to over 20 million acres, which is summer fallowed each year. In the drier regions of the West, this is a necessary practice if moisture is to be conserved and land is to be kept free of weeds. However, in the northerly regions, known as the black and grey-wooded soil districts, summer fallowing is a form of extensive land use which is not necessary to good husbandry. This region has an adequate rainfall to support a form of rotation farming which could almost eliminate summer fallowing. Farmers are unlikely to adopt such rotations, however, until food demands increase to levels which would justify the practice. This is one area in which the intensification of land use has a considerable way to go. Almost 30% of the improved land area in these regions was in summer fallow in 1955. The pressure of demand for livestock products might well reduce this drastically over the next 25 years. If it could be reduced by half, the area available for rotation farming to yield forage and grain crops would amount to nearly six million acres of improved land. This is almost as much as

<sup>10</sup> For the method of reaching this conclusion see p. 263, Chapter 10, on Prairie agriculture.

the total addition to the improved land area in western Canada from 1941 to 1951.<sup>20</sup>

### 3. *Irrigated Land*

A substantial contribution can be made to future production through the more intensive use of existing irrigated lands in western Canada. The irrigation projects developed up to the present are being utilized in forms of agriculture which make poor use of the benefits of irrigation. The process of adjusting land use to make more intensive use of these lands is occurring very slowly. Demands for livestock products of the order envisaged in Chapter 2 are likely to encourage an increase in the rate at which land use is changing from grain farming toward forage and livestock production. The developments which are now planned will add some 800,000 acres to existing irrigated lands in the Prairie region. If the irrigated land in British Columbia is excluded from consideration on the grounds that it is already being farmed intensively, this will mean 1.5 million acres of land in irrigation projects in 1980, without any new developments being undertaken. The contribution to future production through the gradual intensification of this land will be very substantial.

### 4. *Fertilizer Application*

The use of fertilizer to increase crop yields and to improve pasture carrying capacity in Canadian agriculture is still in its infancy. Up to the present the only farmers who have felt that a substantial gain was obtained through fertilizer were those growing such intensive crops as fruits, vegetables, potatoes and tobacco. The use of fertilizer for pasture improvement is hardly considered as practical by most farmers, and almost all of the grain grown in Canada comes from land on which fertilizers have never been used. Evidence of this can be obtained from Table 32.

In ten years fertilizer application per acre more than doubled. When it is considered that the heavier rates indicated in the Maritimes and in

Table 32

## EXPENDITURE PER IMPROVED ACRE FOR FERTILIZER (1949 constant dollars)

	1931	1941	1951
Prince Edward Island.....	2.08	1.33	2.72
Nov Scotia and New Brunswick.....	1.78	1.40	2.86
Quebec.....	0.28	0.42	0.77
Ontario.....	0.35	0.46	1.44
The Prairie Provinces.....	0.00	0.02	0.13
British Columbia.....	0.96	1.14	1.36

SOURCE: Compiled from D.B.S., Reference Paper No. 25, Pt. II, using the index of fertilizer prices contained in *Price Index Numbers of Commodities and Services Used by Farmers*, D.B.S. Memorandum.

<sup>20</sup> For a fuller account of this development, see p. 265 (Chapter 10 on Prairie agriculture).



British Columbia arise from the production of fruits, vegetables and potatoes, and that in Ontario most of the application is on tobacco and vegetables. It is evident that fertilizers are not widely used even in areas where moisture limitations do not restrict their value. While many farmers could benefit from a fuller use of the existing knowledge about fertilizer use, supply of agricultural products has tended to keep ahead of demand, and there has been little general incentive to increase fertilizer applications. It is more than probable that in the future the economic return from fertilizer use will be sufficiently attractive to extend its use in both eastern and western Canada.

### 5. *Technological Advances in Field Crops*

In the last 25 years many advances have been made in the development of weed killers, in insect control, and in the control of smut, rust and other plant diseases. Notable advances have been made in seed selection and in the use of registered seed varieties. The use of existing knowledge along these lines is not widespread. Apart from any new developments, substantial gain could result from the application of present knowledge. It seems likely that in a few years a satisfactory means of controlling wild oats will be found. This will make a substantial difference to grain yields. The research and development of grain suitable for the areas of short growing seasons, and the development of disease-resistant varieties has occupied the time of many of our plant breeders. If, in the future, the same attention is given to pasture improvement, the livestock carrying capacity of eastern Canada can be increased considerably.

### 6. *Technology and Livestock Production*

Increases in the output of beef, hogs and livestock products per acre of improved land can be brought about, not only through the improvement of the carrying capacity of the land, but also through better breeding, rearing and feeding of the livestock themselves. Present knowledge in this area is far ahead of farming practice. There are many methods by which the efficiency of livestock production could be raised at present. As research and education are continued these methods are likely to increase in number and effectiveness. Better breeding, feeding, rearing and housing imply some deliberate planning for long-term increases in output. For many Canadian farmers the expectations of future demands have never seemed certain enough to make the investment appear worthwhile. A strong market will bring about the adoption of all methods which can increase output.

A quantitative measure of the effects of technology is not easily found. Some suggestion of past trends and a consideration of future prospects are attempted in Chapter 4. Before passing on to this, it is worthwhile considering the future balance between land development and intensity of land use.

### V. *Land Intensity versus Land Development*

Any tendency to increase output in agriculture suggests increasing cost. The development of new land must be a cost-increasing factor, because the best land is already developed. Increases in intensity of land use must also imply increasing costs beyond some point where successive applications of labour and capital to land result in decreasing increments of output. But in the process of intensifying land use, the ingenuity of man has been applied to the task of preventing returns from diminishing and costs from increasing. Developments have been of two kinds. The first is the kind which raises output per acre without reducing labour input, and raises it more by value than the cost of the technique itself. Examples of such techniques are chemical fertilizers and weed killers, better yielding varieties and disease-resistant species. In the past, Canada has benefited less from the wide use of such techniques than from those of the second group. These increase output per man by replacing labour by capital in the form of machines which reduce costs per acre and per man. The mechanization of agriculture in recent times is clear testimony to this process.

Agricultural output has been increased in the past both by pushing out the extensive margin of production in Western Canada and by improving production per acre and per man in all regions. Output has been increased without increasing the cost of food production per unit in most instances. In Table 33 the purchasing power of agricultural products at wholesale is expressed relative to the general movement of all wholesale prices. This is a measure of the real cost to the consumer of agricultural products.

Table 33

### THE PURCHASING POWER OF AGRICULTURAL PRODUCTS (1926 = 100)

	1926-30	1950-54 <sup>a</sup>
Wheat.....	100	79
Oats.....	100	85
Barley.....	100	106
Hogs.....	100	106
Eggs.....	100	66
Poultry.....	100	70
Cheese.....	100	138
Butter.....	100	84
Beef.....	100	275

<sup>a</sup> It was not possible to compare 1926-30 with 1951-55 because annual prices of grain for 1955 were not available.

SOURCE: *Farm Prices*, Quarterly Bulletin of Agricultural Statistics.

"Index of Wholesale Prices", *The Economic Annalist*, Vol. XXXVI, No. 1, 1956.

This table indicates that techniques of grain production have been cost reducing, largely because of substitution of machines for men in the production process. The purchasing power of grains is falling, because cheaper means of production are being found at a rate which more than compensates for the rising costs of increasing output. The same trend is found in the prices of grain-fed livestock, for example, pigs and poultry. Cost-reducing tendencies here have not been quite so effective because technology has been directed more toward field mechanization than toward reducing costs of rearing producing livestock. Where mechanization has had least effect, namely, in forage crop production and livestock breeding and rearing, the demand for livestock and livestock products has tended to go ahead of technological processes, and relative price rises have occurred.<sup>21</sup>

It seems clear that if the demand for livestock and livestock products envisaged in Chapter 2 is to be met without incurring steeply increasing costs technology will have to be directed at increasing output per acre and future trends in mechanization will have to be sufficient to offset the increased labour inputs which would otherwise occur.

It seems likely that present knowledge applied to the existing land area can produce more of the livestock required and that if extra costs is incurred it will be much less than that of land development. Canadian agriculture has just passed through one revolution which has been cost reducing. Crop production is now mechanized. In intensifying land use in the future, technology will continue to be applied and it can confidently be expected that cost-reducing techniques will be found. These will tend to offset the increasing costs which might otherwise result from increases in intensification.

## *VI. The Conservation of Agricultural Resources*

The data on land use and land supply suggest that Canada is now pressing on the extensive margin of cultivation. It does not follow, however, that land as a resource is so scarce and valuable that steps must be taken to ensure the conservation and preservation of all agricultural land. A satisfactory definition of what is meant by land conservation is not easy to frame. In general what seems to be implied by the term is that the present use of land should be balanced against future uses to get the most out of it over a given period of time. The interpretation of what is necessary to meet this definition is very variable because people generally think forward over periods of time which vary in length.

<sup>21</sup> In Table 33 the rise in purchasing power of beef is influenced by the fact that 1950-54 was the top part of a beef price cycle. The direction of price, nevertheless, is upward, even though it may not be as emphatic as this index shows. It is true, of course, that short-run changes in demand and supply are reflected in these indexes. This is particularly true in the case of butter. Short-run effects have been modified by the use of five-year averages but they cannot be eliminated.

Our interpretation of the statistics on farmland and estimates of resources suitable for future use is that it will become progressively necessary as time passes to build up the level of productivity of agricultural land. It seems likely, however, that what will make this necessary is the rise in demand for livestock and livestock products which will make itself felt through the market. In other words, it will become progressively more profitable to maintain a higher level of productivity.

There is nothing absolute about fertility, and no one can say what level of fertility is suitable or desirable. Productivity levels vary rather like water in a reservoir. It is drawn on when required and replaced later. The process has no time limit to it. There is no doubt that first settlement of Canadian farmland brought with it a depletion of native fertility. This was in the best interests of the settlers and of the nation at that time. By using up this fertility it was possible to establish new communities, new railways, new elevators and all forms of capital equipment which it would have taken years to build otherwise. If the first settlers had been strongly concerned about future land use they could not have established the relatively rich country which we live in. Land can depreciate for some time and then be restored to a high level of productivity without the process being costly. In the short run, rotation farming is a depleting and replacing procedure; fertility may be depleted for a period of time before land in the possession of the older generation passes to the new generation of farmers.

What seems likely, therefore, is that land use in Canada is approaching a period when productivity levels will be built up, because this will be the most profitable way of meeting food demands. Particular concern over land conservation could lead to the encouragement of methods of soil building which might, in the end, prove more costly than letting the use of land be determined by the force of changes in the prices of different agricultural commodities.

It seems probable that the aim of obtaining the optimum use of land resources will be achieved best by giving attention to research and extension work to increase the agricultural output of those products in most demand. Livestock production is a form of agricultural production which will require higher levels of land productivity, and so it seems that we are now moving into a period when the aim of conservation and the profit incentive will be going in the same direction.



## TECHNOLOGY AND INCREASED OUTPUT

### *I. Introduction*

In the last three chapters we have reviewed past changes in agricultural organization and production, estimates of the rate at which the demand for farm products is rising and the extent of land resources. The conclusions drawn from these chapters are worth reiterating. Labour as a production factor has been pushed and pulled out of agriculture as new techniques of production have developed in both agriculture and other industries. The use of land resources has increased in physical quantity, but at a slower rate than formerly. The transfer of production from one area to another has perhaps been more important in increasing output than have additions to the total physical area. Changes in the technical processes of farming have been largely responsible for the rate at which these transfers have taken place. It is clear from Chapter 1 that much of the recent increase in output has come about through the use of new techniques in farming requiring the application of more capital to a slowly expanding land area. At the same time economies in labour input have been sufficient to allow a decline in the application of this factor of production.

A quantitative measure of increased output resulting from new techniques is more easily produced in the aggregate than for particular processes or for individual crops and types of animals. Up to the present no thorough study has been made of progress in agricultural technology. Such a study is a prerequisite to a much more interesting one, which would attempt to explain the development and innovation of technology as an economic activity. Schultz has pointed out that looking upon new techniques as occurrences which happen regardless of economic considerations has led to a serious neglect of the economic processes through which the techniques become part of the activity of production.<sup>1</sup>

<sup>1</sup> T. W. Schultz, *The Economic Organization of Agriculture*, McGraw-Hill, New York, 1953, pp. 109-111.

New scientific developments are discovered through the efforts of scientists and engineers who do not often consider their practical application. In many instances the agricultural application results from the resourcefulness of a few farmers. There is no production plan for techniques, and there is certainly no production schedule for the rate of their adoption. To discuss the future effects of technology is to discuss something in which we have implicit faith rather than something which can be clearly planned and directed at a measurable rate. In farming, advances in agricultural technology come about through the efforts of public agencies such as the Science Service of the Federal Department of Agriculture and the Experimental Farms Service. New techniques are seldom patented, and every effort is made to make them widely known through the activities of extension workers in the various provinces of Canada.

When economic circumstances are suited to an innovation, there are few barriers to its adoption arising from competition within agriculture. Whereas in some industries new methods are not adopted until existing machinery is fully depreciated, obsolescence is no restriction on the rate of adoption in agriculture because it is made up of thousands of small producers who are highly competitive with one another. This competition makes the adoption of a new technique by each producer necessary for economic survival. A clear illustration of this is to be found in the rate at which farming in Canada became mechanized. The response has been slow only in areas where there are institutional barriers to the reorganization required. The obstructions have not come from the competitive structure of the industry itself. The same is true of many of the other techniques which are now available to farmers. It is institutional rigidity which obstructs the rate of technological change.

With complete confidence we put forward the proposition that even though little can be predicted about the future development of new techniques much can be expected from an increase in the extent to which existing techniques are used. Recent technological advances have been many, and, in the last 15 years, farm production has improved in efficiency at an astonishing rate. The technological changes which brought this about are far from being fully applied. With knowledge already at hand it will take years, perhaps decades, to put into practice all that is already known.

The over-all increase in the volume of agricultural production in the last 25 years appears to be between 30% and 40%.<sup>2</sup> Between the average of the years 1926-30 and that of 1951-55 the prices of farm products at wholesale, relative to all commodities at wholesale, rose very slightly.<sup>3</sup>

<sup>2</sup> The index of physical volume of production based on 1935-39 produces an increase of 38% between then and the average of the years 1947-55. If farm cash income is deflated and put on a base at 1926, no increase is apparent until 1939, and the increase from 1926 to the average of the years 1947-55 is also 38%.

<sup>3</sup> Agricultural prices were 5% above the level of all wholesale prices in 1926-29 and 14% in 1951-55 relative to 1926=100.

When short-run effects are allowed for, there appears to be no general rise in the relative prices of agricultural products. Over the period since 1939, in which almost all of the increase in output was experienced, the increase in improved land area was 13%. Thus, per acre of improved land, there has been a net increase in productivity of about 22%. As many of the new acres which came into agriculture over this period would be relatively unproductive, the increase in some areas must have been much greater. Regional changes in land productivity are given in Table 34.

Table 34

### CHANGES IN THE PRODUCTIVITY OF IMPROVED LAND PER ACRE BY PROVINCES, 1935-39 TO 1947-55

(percentages)

Region	Change in index of production	Change in acreage of improved land	Increase in productivity per acre
Prince Edward Island . . . . .	40.0	-16.0	67.0
Nova Scotia . . . . .	8.6	-20.0	14.0
New Brunswick . . . . .	24.0	-25.0	65.0
Quebec . . . . .	28.0	-18.0	56.0
Ontario . . . . .	24.0	-4.0	29.0
The Prairie Region . . . . .	52.0	+20.0	27.0
British Columbia . . . . .	37.0	+63.0	-15.0
Canada . . . . .	38.0	+13.0	22.0

N.B. Land changes are measured from the 1931 census to the 1951 census. No data are available for improved land in farms in Eastern Canada for 1936. The differences in land area between 1931 and 1936 were thought to be slight enough to make no material difference to the measurements.

SOURCE: D.B.S., Quarterly Bulletin of Agricultural Statistics and Reference Paper No. 25, Pt. III.

In Quebec and the Maritimes the withdrawal from agriculture of the poorest farms has resulted in a considerable rise in the average productivity per improved acre. This comes about more because the poor land has been removed than because of a rise in output. In fact the farms withdrawn contributed little production and pulled down the average level of productivity in 1935-39. Their removal from agriculture has therefore raised the average level. On the other hand, the land added in British Columbia has been in areas more distant from centres of population, and is used less intensively than the fruit and vegetable land which made up a substantial part of the total in the 1930's. Because of this the average level of productivity per improved acre is now lower. There is no doubt that the absolute increases in the level of production have been substantial in all provinces except Nova Scotia. While it is true that the 1930's are a poor base for comparisons of the kind produced in Table 33, a suitable index is not available for an earlier period. The deflated series of farm cash income would lead one to suspect that the average 1926-30 level of production was

only about 4% higher than the average of 1935-39, and, therefore, these figures would stand as increases over the last 25 years.

The increase in the physical volume of production of 22% per acre of improved land has come about in three ways. There has been some increase in crop yields per acre, some increase in the production of livestock and livestock products per breeding unit on farms, and some change in certain regions toward products of a higher value, for example, the increase in tobacco acreage in Ontario, or in the sugar beet acreage in Alberta.

Statistical measurement of the extent to which productivity has increased from each of these three sources is rather difficult with the data available on Canadian agriculture. In view of the importance of technology in increasing output, however, some attempt should be made to illustrate the extent of the process. The discussion will be divided into three parts in order to illustrate the relative emphasis of changes in technology in recent years. Cereals are sufficiently important to production to warrant consideration by themselves; other field crops will be discussed as a second group; livestock and livestock products also provide a suitable group for discussion.

## II. Cereals

The average yields in Canada of the major grains, wheat, oats and barley, are really a reflection of the yields of grain in the Prairie Provinces, because a very large part of the grain is produced in that region. Fluctuations from year to year in yields per acre in the Prairie Provinces are very great, but, even when these are overlooked, it is difficult to suggest that there is a trend upward in the yield per acre of any one of the three major grains (see Table 35).

Table 35

### LONG-TERM AND FIVE-YEAR AVERAGE YIELDS OF THE MAJOR GRAINS, THE PRAIRIE REGION 1908-55

(*bu. per acre*)

Average	Wheat	Oats	Barley
1911-15.....	20.7	41.0	29.3
1916-20.....	13.2	30.5	21.9
1921-25.....	16.4	31.4	24.8
1926-30.....	18.1	29.5	23.9
1931-35.....	12.2	23.1	17.2
1936-40.....	13.1	23.4	19.8
1941-45.....	17.5	33.7	26.1
1946-50.....	15.1	28.5	21.9
1951-55.....	21.4	39.1	28.4
1908-55.....	16.4	31.4	23.8



These figures do suggest, however, that the native fertility of the virgin soil, which contributed to the high yields of the early years, may have been replaced in the latter part of the period by techniques which have prevented the fall in yield which would otherwise have taken place. The yields of grain on the Prairies are very dependent on growing conditions, and in this respect, the exceptional growing conditions of the 1951-55 period are reflected in high average yields for wheat and barley in that period. Even so, they are not significantly higher than in the 1911-15 period, when native fertility was making its maximum contribution. The effects of better seed, better cultivation and better timing of cultivation practices have been to prevent yields from falling, rather than to bring about increases. More malting barley is now grown in western Canada, and this has a higher value per acre; the general quality of feed grains is higher, and it is freer of weed seeds. More feed is, therefore, being produced per acre without much change in yields.

The emphasis has been on output per man on the prairie belt of western Canada, and not on output per acre. Increases in productivity, therefore, are the most difficult type to trace and quantify. The rapidity with which seeding and harvesting can be accomplished will probably reduce the risk of lower yields and poor quality. On the other hand, machine cultivation may have counteracted the effects of technological improvement to some extent. When the emphasis is on output per man, quick methods will be tolerated and land will be wasted in the process of covering large areas. Higher yields may be dissipated in more waste and less thoroughness because, to the worker, what matters is the amount of grain in total, not the land area from which he harvests it.

In actual fact there has been little conscious effort on the part of farmers in the Prairie region to raise the yield of grain per acre. Evidence of the effects of fertilizer on test plots is available in each of the three provinces, and it would seem to suggest that yields can be increased by as much as 30%, with a tendency toward greater increases in the northerly humid areas owing to prevailing moisture conditions. By the use of fertilizer and many of the other practices which produce higher yields, the average yield of all grains in western Canada could be raised.

Until the present, the major influences causing an increase in the index of physical volume of production in the Prairie region have been the low level of yields in the 1935-39 period and the effect of higher value crops such as flax and sugar beets. Along with these the cultural practices which have been applied have prevented yields from falling as virgin fertility has been used up.

In eastern Canada, on the other hand, increases in cereal production per acre are more noticeable. The data on yields suggest an increase in Ontario of about 20% for oats and 13% for barley over the last 20 years.

In Quebec oat yields may be about 10% higher and barley yields 4%, while in the Maritimes there has been slightly more than a 20% increase in both of these crops. Moreover, there has been a noticeable shift toward mixtures of oats and barley, producing a higher yield per acre and an absolute gain in output over the combined yield of each grown separately. The yield per acre of mixed grains is now about 25% higher in Ontario and the Maritimes and 15% higher in Quebec than it was some 20 years ago. Declining fertility and the effects of the corn borer had resulted in falls in yield of corn in Ontario from about 60 bushels per acre in the early 1900's to 40 bushels in the middle 1920's. As yield declined, acreage dropped. After the recent war, however, Ontario corn growers began using hybrid corn and applying more fertilizer; as a result yields rose again from an average of 45 bushels per acre in 1941-45 to 58 bushels per acre in 1951-55. Acreage rose also by about two-thirds, to reach a level of 0.5 million acres.

There is enough evidence here to suggest that the use of fertilizer and of improved varieties of grain is having decided effects on feed grain yields in eastern Canada. A continuation of these processes, along with a tendency to concentrate the production of feed grains on the areas best suited to the purpose, makes it seem likely that the output of feed grains from eastern Canada could easily increase by 20% in the next 25 years, without any change in acreage. Further shifts in grain acreage to western Canada will probably occur, however, and, on the land remaining in grain in the East, yields may rise at a faster rate than is evident from recent experience.

### III. *Other Field Crops*

Substantial increases in yields have been obtained in crops with a high value per acre, such as market garden crops, potatoes and tobacco. Knowledge about fertilizer application on the potato crop and the use of dusts and sprays to control insect diseases, along with attention to disease-resistant varieties, have produced astonishing results. And yet there is plenty of evidence from practices now established in the United States that the economic limits of such measures are far from being reached. The average yield of potatoes per acre in the United States at the present time is about 30 to 40 bushels above the average yield in Canada. We can therefore assume that yields of potatoes will continue to rise for some time to come. Yield increases in potatoes are shown in Table 36.

Table 36

#### AVERAGE POTATO YIELD, 1935-39 AND 1951-55 (*bu. per acre, selected provinces*)

	New Brunswick	P.E.I.	Ontario	B.C.
Average 1935-39.....	173	180	95	179
Average 1951-55.....	270	255	184	263

SOURCE: D.B.S., Reference Paper No. 25, Pt. I.

Production of fodder crops such as hay, silage, and pasture has never received the technical attention in Canada which it has had in countries where land is scarcer and rainfall is more evenly distributed. There is a great deal of knowledge now available about grassland farming, but comparatively little of it is applied to the grasslands of Canada. Until the present, there has been no great demand to increase the carrying capacity of grassland, because enough was available to produce livestock and livestock products in quantities surplus to domestic requirements.

No change is apparent in the yield of hay and silage harvested per acre over the last 20 years. Declines in fertility on permanent grasslands and on rotational pastures have been prevented through the use of better practices. In addition, the nutritive quality of pastures and hay has been raised by including more legumes in grass mixtures. More nutritious feed has been produced from the same yield per acre and, in this way, greater livestock carrying capacity has been provided. A considerable amount of mechanization has been introduced in both silage and hay making. This has allowed these crops to be made in a much better condition; the loss of nutrients through poor weather gave much poorer quality crops 20 years ago than is common today, even in the worst seasons.

Pasturing is regarded in Canadian agriculture as the least intensive method of using land. However, in some areas where land values are high, fertilizer, better seed mixtures and even irrigation have been used to raise the carrying capacity. Attention has been paid to shorter term rotations for pasture, to producing a higher quality grass, to rates of grazing and to controlled grazing using electric fences. Nevertheless, the need for such practices has hardly been felt in most areas of Canada until the present.

#### *IV. Livestock and Livestock Products*

Although the effect of technological improvements is more readily discernible in crop production than in livestock production, there is almost as much statistical evidence for livestock as there is for crops. The evidence indicates that improvements in livestock production have been as effective in raising production levels as they have been in crops. There is one major difference: the changes in crop production often did more to raise output per man than output per acre, whereas those in livestock production have been aimed at increases in output per unit of livestock. Labour-saving techniques have been less effective. An aggregate measure of the improvement in output which has taken place is given in Table 37.

The gain in livestock production per animal unit on farms is about 24%, compared to the increase in all output of 22% per improved acre. Livestock production per improved acre rose by 19% between the two periods indicated in the table. Although gains in livestock production are

Table 37

# PHYSICAL VOLUME OF OUTPUT — LIVESTOCK AND LIVESTOCK PRODUCTS AND ANIMAL UNITS ON FARMS

(index number: 1935-39 and 1951-55, 1935-39 = 100)

	Animal units on farms (excl. horses)	Production of livestock and livestock products
Average 1935-39.....	100	100
1951.....	97	131
1952.....	107	134
1953.....	110	129
1954.....	114	137
1955.....	118	144
Average 1951-55.....	109	135

SOURCE: Compiled from D.B.S., *Livestock and Animal Product Statistics* and from special tabulation of the production index made by D.B.S. for the Commission.

not quite as large as in crop production, an increase of this amount is ample proof of technological change.

In some specific forms of livestock production new techniques have been more effective than in others. The poultry industry has progressed in efficiency at a rate probably unequalled by any other sector of the agricultural industry. The most outstanding evidence of this is the rate at which egg production per hen has increased (Table 38).

Table 38

# ANNUAL EGG PRODUCTION PER HEN

Year	Egg production per hen
1935-39.....	110
1947.....	146 <sup>a</sup>
1948.....	150
1949.....	148
1950.....	151
1951.....	162 <sup>b</sup>
1952.....	180
1953.....	186
1954.....	170 <sup>a</sup>
1955.....	171

<sup>a</sup> Average annual production per 100 layers.

<sup>b</sup> Average annual production per 100 hens over 6 months.

SOURCE: D.B.S., *Memorandum on Production of Eggs*.

There has been a great deal of scientific work done in the breeding, rearing and feeding of poultry. Poultry production has been shifting gradually from a supplementary operation on almost every farm to a specialized operation on farms where up-to-date equipment for the purpose has been



installed. Specialization has reached the point where large-scale commercial hatcheries have replaced the broody hen. Scientific breeding has produced special egg-laying cross-breeds with great vigour and now hybrids with even greater vigour are being developed. As a result, striking increases have been obtained in the rate of laying, in eggs produced per unit of feed input, and in the earliness with which laying birds mature. Electric lights are now used to encourage egg laying in the winter. The use of antibiotics and minerals in prepared feeds is now common, and many drugs and inoculants are available to control poultry diseases which previously reduced or wiped out many flocks every year.

The industry now uses much better housing facilities for egg production. This is partly the result of scientific study and partly because of the greater degree of specialization which has come about. Insulated buildings with controlled ventilation and heating have minimized losses and increased the rate of growth of chickens. Mechanization has been introduced in automatic waterers, feeders, egg collectors, egg washers and graders, and in litter removal.

The experience in egg production in the United States is sufficient indication that such processes as are now used in Canada can be continued with increased effect. In 1954 and 1955 egg production per hen in the United States was 190 eggs per year, a rise of 17% from 1947. In the same period the increase in Canada was 15%. It has been assumed that an increase in the rate of lay can continue to 1980, when it may have reached a level about 50% higher than that prevailing at present.

Poultry meat production has increased sharply also, especially in recent years. The upward trend in production has been caused in part by the swing toward commercial broiler production of chickens and turkeys in the last 10 to 15 years. People now demand a lighter, smaller and more tender chicken than formerly. Feeding to a lower weight has produced an optimum relationship between weight-growth and feed intake. No measures of the efficiency of feed intake are generally available, but specific instances are numerous enough to make one feel assured that the economy in feed has been large.

Technological improvements have increased the efficiency of milk production to a degree which, while it still leaves much to be desired in relation to yields in some other countries, is nevertheless quite substantial. Much of the increase in milk production per cow has come about on farms producing for the fluid market, but producers of milk for processing are also getting higher yields per cow. Some of the improvement has come from better feeding practices and better quality feeds, but there are many other contributing factors. The yield per cow has gone up from just over 4,000 pounds per year to 5,216 pounds between the average of the 1935-39 period and 1955, an increase of about 29%. The average yield per cow

in the United States now stands at 500-600 pounds higher than the Canadian average, but some European countries have average yields more than 1,000 pounds higher. There seems good reason to believe that improvements in milk yields will continue at a rate close to the long-run trend of about 65 pounds per cow per year. In the United States the long-run increase has been about 70 pounds per year. If an increase of 65 pounds per cow per year is maintained in Canada, a yield of almost 7,000 pounds per cow would be reached by 1980. There are many herds in the country at present in which the average yield is in excess of this level.

Input-output relationships in meat production are not so easily produced as they are for eggs and milk. There is greater statistical difficulty in separating data in a fashion which would give some measure of the increase in output per unit of breeding stock general enough to produce a measure of the gain in efficiency over all of Canada. Individual farm data are available, and experimental farms have records which show what can be done in increasing output per unit of feed, or in raising the size of litters of pigs and reducing the mortality rate among young stock. Such data, however, often seem so spectacular in relation to the average achievement under commercial conditions that they cannot be used for projections. Their greatest value is to illustrate the possible as compared to the actual and to act as a yardstick of how great an increase can be achieved.

There are better guides to the rate of increase in the efficiency of production of hogs than there are for the production of beef and veal. Some indication can be gained from a comparison of the number of hogs on farms at June 1 each year with the total output of pork and lard. This is a crude input-output relationship. It is, however, the best that can be produced from the existing statistics. The result of converting these figures to index numbers is given in Table 39.

Table 39

### NUMBER OF HOGS ON FARMS AT JUNE 1 AND OUTPUT OF PORK AND LARD

	Number of hogs on farms	Output of pork and lard	Output per hog on farms
Average 1935-39.....	100.0	100.0	100.0
Average 1951-55.....	133.6	166.0	123.8

These data suggest that there has been an increase of just under 24% in the output of pork and lard per hog carried on farms over the last 16 years. Variations from year to year have been quite great, but the average rate of increase is about 1.5% per year. This is the rate which has been used in making forecasts.

The increase in output per animal on farms is the result of raising more pigs per litter and having more sows bear two litters per year. Much more can still be done in both of these directions. The average number of pigs saved per sow farrowing in Canada is still only about 7.5. Some breeders can often obtain nine, and there is no sound reason why this could not become the level for the majority of breeders. Electric brood lamps and similar devices, in better buildings, should do much to increase both the number of pigs per litter and the number of sows having two litters. It is mainly in the Prairie Provinces that the number of sows with only one litter per year is substantial, but what is required there is a consideration of pig production as a permanent and substantial source of farm cash income. Up to the present time many Prairie farmers have considered it to be an in-and-out proposition. A substantial market rising steadily should do much to increase the efficiency of hog production in the future. It is with a feeling that we err on the low side that we put forward a rate of increase of 1.5% per annum in the output of pork and lard per hog on farms.

A calculation for beef and veal production similar to that for hog production gave about the same result. The number of pounds of beef and veal per unit of cattle on farms at June 1 increased by 26% from the average of 1935-39 to the average of 1951-55. Less assurance is felt about this measure, however, because the cycles in production are greater for beef cattle than they are for hogs.

In each example of the gains in efficiency in livestock production the rate of increase which is produced from the crude statistical data is better than 1% per year, and more likely over 1.5%. Such increases are used in measuring future production requirements because it seems reasonably certain, in view of the room to apply existing techniques and knowledge, let alone what might yet be devised, that productivity increases in the future will be at least as rapid as those of recent years.

## ***V. Labour Productivity***

Increases in output have been produced through the application of better techniques with a declining labour force. Output per man has increased, therefore, at a faster rate than both output per acre and output per unit of capital. Labour efficiency has been so increased that an astonishing rise in productivity has come about. A true reflection of the gain in labour productivity cannot be obtained from a movement in the index of the physical volume of production. This is a measure of gross production which does not allow for the fact that today, and increasingly, agricultural production results from a substantial use of production requisites obtained from other industries. Some concept of the value added within agriculture itself is necessary before a true measure of the increase can be found. It is also necessary to remember that the number of working hours per man

has been steadily declining, so that the comparison which truly reflects productivity increases is that of net value added per man-hour. The progress which has been made in this direction is shown in Table 40.

Table 40

## LABOUR PRODUCTIVITY IN AGRICULTURE

(1935-39 average = 100)

	I Gross Domestic Product <sup>a</sup> per man-hour	II Gross Physical Product per man-hour
Average 1926-30.....	110	N.A.
Average 1935-39.....	100	100
1946.....	129	142
1947.....	121	145
1948.....	142	158
1949.....	142	161
1950.....	147	194
1951.....	202	242
1952.....	222	259
1953.....	218	248
1954.....	169	181
1955.....	220	248
Average 1951-55.....	207	236
Average 1947-55.....	176	204

<sup>a</sup> The Gross Domestic Product is the total value of the output of the products and services minus the cost of materials.

SOURCE: Column I estimated by Department of Trade & Commerce, unpublished data.

Column II derived by dividing D.B.S. series on physical volume of production as published in the *Quarterly Bulletin of Agricultural Statistics* by Trade & Commerce estimates on man-hours of work in agriculture.

The indications from this table are that productivity of labour has increased by about 75% between the prewar period and the present time, and that the volume of output per man has actually increased by 100% owing to the increased use by agriculture of production factors which originate outside the industry. If a longer series is taken to allow for the low level of agricultural output in the 1935-39 period, productivity per man has probably risen by about 60% (with the average of 1926-30 as 100, G.D.P. per man equals 158 in the average of the 1947-55 period). In 25 years this is a simple increase of 2.4%. In actual fact most of the increase took place in the period after 1941, and more particularly after 1946. It is in large part due to the mechanical revolution in agriculture in this period. It seems quite evident, nevertheless, that very substantial increases in output are possible in the next 25 years with a labour force which is considerably smaller than that of 1955 and allowing for the fact that the working week will gradually become shorter.



## *VI. Some Observations on Technology and Output in the Future*

As is suggested at the beginning of this chapter, technological change takes place rather erratically and in a fashion which cannot be predicted. It is surely true, however, that better levels of education can be expected in all sectors of the economy in the future. The young farmer today is eager to adopt modern techniques and to find means of mechanizing production processes. The technical means available to the alert producer for increasing production, if applied generally throughout the industry, could probably raise production to levels sufficient to meet most of our demands for food 25 years from now, without new techniques or new labour-saving devices. The agricultural extension services available in each of the provinces will become increasingly effective throughout the 25 years, as the adoption of better techniques becomes more and more profitable.

In the next chapter the modest assumption is made that technology will continue to increase productivity at a rate in the future similar to that of the last 10 or 15 years. A rate much faster than this would probably come about if some of the institutional rigidities could be removed. Some of the difficulties in the way of increased productivity are the obstacles in the way of reorganization of farm boundaries and capital rationing which impedes the rate of adoption of changes requiring substantial long-term investments by farm producers. An additional problem is the disseminating of technical knowledge widely and quickly.

Even this crude survey of technological potentialities seems to point to the conclusion that the means of increasing productivity per acre without meeting increasing costs per unit of output in the long run are within the reach of many agricultural producers today. The examples cited in this chapter suggest that the greatest increases have come about in the most intensive forms of farming. Yield increases are more spectacular in potato and tobacco production than they are in the production of oats and barley; milk and egg production have increased more spectacularly than beef production. The reason this has been so is that the area of land best suited to the more intensive forms of production is much more restricted than the area which can be used in the extensive types of farming. Attention has been given to reducing the labour input in the more extensive forms of farming, and this will continue to be the case. In the future, as the demand for food rises, the extensive forms of farming such as the raising of feeder cattle and the growing of feed grains may become more intensive because the techniques by which output per acre can be increased are known and available, while new farming land will be costly and will yield less profitable results.

## **PROSPECTIVE CHANGES IN THE STRUCTURE OF CANADIAN AGRICULTURE, 1955-80**

### *I. Trends in Output*

#### *1. Volume and Nature of Output*

The emphasis on livestock production in Canadian agriculture is expected to increase considerably. In the period 1951-55 the proportion of cash income which came from livestock and livestock products was 53.1%. Our demand analysis suggests that the main source of future markets for Canadian agricultural producers is the domestic market and that this will be shaped by the rate of growth in the population and the rise in real incomes per capita. For some time to come and probably, in fact, for the next 25 years, technology is likely to effect increases in output per man at a faster rate in grain production than in livestock production. This will mean a slower rise in grain prices than in livestock and livestock product prices, and this, combined with the rising volume of demand for livestock and livestock products, would suggest that even by 1965 the proportion of cash income coming from livestock and livestock products will have risen considerably above the 1951-55 level. A further implication of our analysis is that in the 1965-80 period this proportion will rise steeply and that by 1980 even the Prairie region will be dependent on livestock and livestock products as the major source of farm income. In the 1951-55 period, in the Prairie region, the proportion of cash income represented by livestock and livestock products was 34.5% compared with 21.4% in the 1926-30 period.

The direction of agricultural output suggested by our analysis is brought out in Table 41.

It can be seen from this table that up to the present the physical volume of livestock and livestock products has increased at a rate which closely parallels the rate of growth in the population. Between now and

Table 41

## PHYSICAL VOLUME OF AGRICULTURAL OUTPUT

*Past trends and future estimates**(average of 1935-39 = 100)*

	1935-39 average	1947-55 average	1955	1965	1980
1. Index of physical volume					
Total output .....	100.0	138.5	151.0	172.0	232.0
2. Index of physical volume					
livestock and livestock products					
output .....	100.0	127.4	137.4	180.0	265.0
3. Index of population growth .....	100.0	127.0	141.0	177.0	242.0

SOURCE: 1. D.B.S., *Quarterly Bulletin of Statistics* for 1935-39 and 1947-55; 1965 and 1980 estimates made by Commission staff.

2. Data for 1935-39 and 1947-55 specially compiled for the Commission by D.B.S.; 1965 and 1980 estimates made by Commission staff.

3. Data for 1935-39 and 1947-55 are D.B.S. Population Estimates; 1965 and 1980 estimates made by Commission staff.

1965 this development is expected to continue, but while in recent years the rate of increase in population has tended to keep ahead of that in livestock production, so that domestic requirements in the 1951-55 period were being met out of production previously exported, it is suggested that in the future livestock production will need to increase at a faster rate than population. The analysis also assumes that aside from some export of specialty cuts of hog meats to the United States livestock and livestock products will be consumed in the domestic market.

On the other hand, it is expected that the growth in the physical volume of total agricultural output will expand at a slightly slower rate in the future than the rate at which the population increases. The reason for this is that livestock production, being a more roundabout form of agricultural production, will absorb a larger proportion of the output of grain. It has been the influence of grain production which has kept the rate of increase in agricultural production ahead of population growth in the past. In the absence of any strong guidance on future exports of agricultural products, the assumptions built into the physical volume indexes for 1965 are those derived from the analysis of Chapter 2. They include assumptions that wheat exports will rise slowly, if at all, but that they are unlikely to fall; that malting barley will continue to find export markets; that other grain exports are sufficiently uncertain to warrant omitting them from considerations on production shifts; that meat exports, other than specialty cuts of hog meat, are not likely; and finally, that exports of other agricultural products will remain substantially the same as at present. Should these assumptions prove wrong, the cumulative effects would raise the index of physical volume of all agricultural output by the amount of the feed grain exports, and the livestock and livestock product index would be increased by the development of hog exports. In this event,

the index of physical volume of production would rise faster than population increased, but livestock and livestock products would still dominate it and they would still be the major source of cash income in all regions of Canada.

Within this general pattern the emphasis in output will be on the production of meat, in the form of beef animals, hogs and poultry. Substantial increases in egg production will be required, whereas the increase in milk output is expected to be relatively moderate. The quantitative estimates of the shifts in total domestic requirements were shown in Table 13 but are reproduced here for convenience in Table 42.

Table 42

### TRENDS IN DOMESTIC REQUIREMENTS FOR LIVESTOCK PRODUCTS

(average of 1951-55 = 100)

	1965	1980
Red meats.....	140	218
Poultry meat.....	136	214
Eggs.....	143	231
Dairy products.....	129	168
Total livestock and livestock products.....	138	204

SOURCE: D.B.S., *Livestock and Animal Product Statistics, 1951-55* and special calculation on total index made for Commission by D.B.S. Both 1965 and 1980 are Commission estimates.

The importance of hogs and beef cattle in the increased production of livestock and livestock products is sufficient to suggest that in the output pattern of the future, meat animals will make up an increasing share of farm income. Poultry and eggs are likely to increase in volume to a degree sufficient to maintain their importance as a source of income, but dairy products will decline in relative importance.

The tendency for the domestic market to absorb an increasing proportion of the total production is likely to become more pronounced as the 25-year period passes. This is also an underlying assumption of output predictions. It is pointed out in Chapter 1 that recent changes in the pattern of agricultural exports show a considerable increase in the proportion represented by coarse grains and a considerable decrease in the proportion represented by livestock and livestock products. The proportion of all agricultural production exported has been maintained in recent years, however, at the same level as 25 years ago. The analysis of Chapter 2 suggests that a considerable part of the export of coarse grains in recent years was due to circumstances of a short-run nature. If this is the case, then the proportion of agricultural production exported in the future will decline. The composition of agricultural exports is expected to change so



that the proportion represented by livestock and livestock products (16% in 1951-55) will decline further and the proportion from wheat will rise (47% in 1951-55). Should the assumptions regarding export markets be in error, it is still likely that the total of all agricultural exports will decline as a proportion of agricultural output, because of the large increase expected in the domestic population.

Agricultural output is expected to increase in total by about 68% from the average output level of the period 1947-55 to 1980. If the proportion of exports is to be maintained, they will have to increase in volume by more than this amount, because the increase in output of 68% is predicated on a decrease in coarse grain and livestock exports. At the moment it is difficult to envisage such an increase in the volume of any of the major agricultural exports. It therefore seems highly probable that a greater volume of agricultural production will be sold in the domestic market and that the trend in this direction will increase as time goes by.

The only item in the livestock and livestock product group for which exports are expected to continue is pork. In the 1951-55 period net exports of pork represented 5% of production. On the assumption that some increase can be expected in the market for the specialty cuts of hog meat sold in the United States, but that no other market is sufficiently evident to be considered, exports would decline to 4% of production by 1965 and 3% by 1980. Net exports of poultry, eggs, beef, and cheese are already almost at zero, and there is no evidence to suggest that any markets other than the domestic one can open up for these products.

In crop production, a decline in the importance of exports is also considered likely. Coarse grain exports for feed are unlikely to grow at the rate at which domestic disappearance will rise as the consumption of meats and poultry products increases. Our assumption is that they will decline absolutely as well as relatively when compared with the 1951-55 period, in which exports of barley have been extraordinarily high.

## 2. *Regional Specialization in Production*

It can be expected that Ontario and the Prairie region will maintain their prominence as suppliers of agricultural products. It is suggested in Chapter 3 that a considerable amount of intensification of land use is possible in the Prairie region of Canada and that land available for future settlement lies almost entirely in that region. The production potential of the Prairie region is considerably in excess of that of any other region in Canada. It seems very probable that the proportion of all agricultural production which comes from that region will rise at an increasing rate throughout the period of the next 25 years.

Regional specialization of production is unlikely to shift in directions which are not already evident. All regions now obtain a greater proportion

of income from livestock than they did 25 years ago. The direction of future consumption patterns, and the assumptions made about export markets, suggest that this will become increasingly the case. The trends in the past are all likely to become more emphatic as the next 25 years pass. It seems probable that the future production of processed milk products will become more and more centred in Quebec, and that beef cattle finishing may become increasingly common in eastern Canada. Poultry farming will become more specialized, and the centre of this specialization will probably remain in Ontario. Quebec, however, may produce an increasing share of the total of eggs and poultry as the period progresses, especially if freight assistance on grain is continued. The Prairie region will become the most prominent producer of livestock, in the form of beef and hogs. At the moment, that region produces a slightly greater share of the beef than Ontario, but not a greater share of the hogs. The share of beef production coming from the Prairie region is likely to increase after 1965, and that of hogs is likely to rise before that date. By 1965 more hogs will be produced in the Prairie region than in any other region of Canada.

Cattle and hogs are now the major source of income in Ontario and, in Quebec and the Maritimes, they have recently become as important as dairy products. In the Prairie region, grain production, which provided 77% of the farm cash income in 1926-30 and 63% in 1951-55, may fall to below half of the farm income of the region as the demand for livestock strengthens. In British Columbia, the main contributors to cash income in the past have been dairy products, poultry and poultry products, and fruits and vegetables. At the present time dairy production is the most important source of income, but it is followed closely by the other two. In the future the pattern of specialization may maintain this situation, largely because dairy production will be mainly the production of fresh milk for direct human consumption.

## *II. The Organization of the Farm Business*

### *1. Land Area*

In Chapter 3 the nature and extent of the land which will be available for farming in the future was considered. It was concluded that the amount of new land which will likely be brought into agriculture in the next 25 years is not large. It is now necessary to consider what this implies about the nature of farm production and organization. The first part of this chapter shows clearly that in the future the farms in all regions of Canada are likely to become more concerned with the production of livestock and livestock products. The production requirements must be linked to existing trends in the general organization of farm businesses to test the feasibility of producing the estimated volume of production suggested by the trends in demand.

The first assumption is that the only new land which will be brought into farms is that which is now considered suitable for agricultural settlement. In Chapter 3 this is estimated at a total of six million acres. In what follows it is assumed that this amount of land will be added to farms by 1980. In the absence of any clear guides as to the rate of settlement, it is assumed that between 1951 and 1965 as much land will be settled as between 1965 and 1980.

The second assumption is that land will continue to go out of agriculture in eastern Canada at a rate which will more than counteract the amount of new settlement in eastern Canada. In the period 1941-51 there was a net decline of 4.1 million acres in the occupied land area in eastern Canada. It has been considered probable that as much land will go out of agriculture between 1951 and 1980 as in the period 1941-51. The increase in population and the demand for more livestock and livestock products is likely to slow up the rate at which land is lost to farming as the period under consideration progresses. The rise in the demand for food seems unlikely to prevent land from going out of farming, however, because there are still many farms on which mechanization and more intensive cultivation are not likely to occur, considering both their physical and economic limitations. For these reasons it is suggested that the net loss of occupied farm land in eastern Canada between 1951 and 1965 will be about 2.7 million acres, and that between 1965 and 1980 it may be as much as 1.4 million acres.<sup>1</sup>

On the basis of both of these trends the land area occupied for farming is expected to change at the rate and in the manner indicated in Table 43.

Table 43

## EXPECTED CHANGES IN LAND OCCUPIED FOR FARMING

(million acres)

	Eastern Canada	Western Canada	Canada
Land in farms 1951 . . . . .	45.4	128.6	174.0
Land in farms 1965 . . . . .	42.7	131.6	174.3
Land in farms 1980 . . . . .	41.3	134.6	175.9

It was also indicated in Chapter 3 that the process of increasing the amount of improved land in each farm would continue. The suggestions about the rate at which domestic demand will increase which are made in Chapter 2, along with the assumptions about the limitations of new

<sup>1</sup> Some basis for these estimates can be found in the discussions of regional trends in Chapters 7 to 11.

settlement in Chapter 3, imply that the rate of improvement will be accelerated in the next 25 years. However, there are limits to the extent to which this is possible. The improved land area is therefore expected to grow as follows:

1951.....	96.9 million acres
1965 <sup>2</sup> .....	100.1 million acres
1980 <sup>2</sup> .....	102.7 million acres

## 2. *The Number of Farms*

The number of farms in Canada has been declining steadily since 1941. This trend can be expected to continue, but the rate of decline in farm numbers is unlikely to be as great as in the 1941-51 period. The process of mechanization brought about a decline in the number of farms through the consolidation of some farms and the abandonment of others which were unsuited to mechanized production. The process of mechanization can never be considered as complete, but the rate at which machines were adopted between 1946 and 1955 is unlikely to continue. The slower rate of mechanization in the future, linked with the rising demand for livestock and livestock products, will tend to slow up the rate of farm abandonment and also the rate at which farms can be consolidated. A wave of mechanization such as that experienced by Canadian agriculture in recent years, however, must leave in its wake a need for reorganization and adjustment. The studies of individual regions bear clear testimony to this fact. They all outline the extent to which future readjustments in the size of farm businesses is likely to result in a decline in the number of farms.

The need to intensify output (within the limits of the assumptions on new land settlement) will be greater after 1965 than before and, therefore, the extent to which intensification of output is likely to counteract the process of farm consolidation will also be greater. For these reasons the number of farms in Canadian agriculture is likely to decline to 570,000 by 1965 and to 540,000 by 1980. This degree of reorganization, when considered together with the expectations on land settlement, would produce farms of an average size of 306 acres in 1965, and 326 acres in 1980, compared with an average size of 279 acres in 1951. The rates of change implied by these assumptions are shown in Table 44.

Table 44

### INDEXES OF FARM SIZE AND NUMBER OF FARMS<sup>3</sup> (size and number in 1941 to equal 100)

	1941	1951	1965	1980
Farm size.....	100	110	124	129
Farm numbers.....	100	92	84	80

Based on census data for 1941 and 1951 and assumptions made by the Commission staff relative to 1965 and 1980.

<sup>2</sup> These figures are net of the loss of improved land which will result from farms going out of agriculture.

<sup>3</sup> See special note p. 99.



The regional trends in farm numbers are given consideration in the regional studies presented in Part II. It is expected that the number of farms will decline in all regions except British Columbia. In the Prairie region the decline in numbers is expected to arise almost entirely from consolidation. In eastern Canada it is expected to come about from a combination of the withdrawal of land from agriculture and consolidation.

### Special Note

Most of the basic material used in this study was drawn from official sources, and as would be expected, the records and publications of the Dominion Bureau of Statistics provided the bulk of the data. Generally, the statistics used were those available for the time period to the end of 1955. The manuscript for the study which was in course of preparation until the end of August 1956 incorporated revisions of official statistical series available up to that time.

Statistics from the Canadian Censuses provided important basic information for analysis of trends in farm organization. Just after this study went to the press, some results of the 1956 Agricultural Census were made available. These results on the whole do not affect the direction of projected changes for Canadian agriculture as already described in the study. They do point to a considerable acceleration in the rate of change, such as for example in the decline in numbers of farms. For the time being, it is a question of whether this acceleration simply represents a departure from the longer-term trend previously discernable, or whether the speeded-up rate of change represents a new trend. Particularly the buoyancy of the non-farm sectors of the economy during the past two years, coupled with a continuance of a high supply position in farm commodities and the consequent less favourable terms of trade for agriculture, lend support to the suggestion that the Census figures represent a temporary departure from the longer-term (25-years trend). Against this, however, the processes of mechanization and technological development are being taken up at a rapid rate, and the longer-run projections of gains in productivity in agriculture may have been understated.

In any event, taking account of the most recent data on numbers of farms the projections shown in Tables 44 and 48 are modified for the most part only slightly. Revisions of certain of the projections based upon the 1956 Census results and comparisons with the pre-Census projections are shown in Tables 44A and 48A.

Table 44A

### INDEXES OF FARM SIZE AND NUMBER OF FARMS

	1941	1951	1965		1980	
			Revised <sup>a</sup>	Original <sup>b</sup>	Revised <sup>a</sup>	Original <sup>b</sup>
Farm Size.....	100	110	126	124	135	129
Farm Numbers...	100	92	80	84	75	80

<sup>a</sup> Based on 1956 Census results.

<sup>b</sup> As given in Tables 44 and 48 respectively.

### 3. *Mechanization*

The process of mechanization is a continuous one. In Canadian agriculture the mechanization of field operations has been the major development in farm organization since 1941. There is room for this to proceed further. Although the number of horses on Canadian farms has declined very rapidly, there were still 871,000 horses, or approximately 1.5 horses per farm, in 1955. It is expected that there will be a continuous decline in horse numbers throughout the 25-year period, as tractors replace horse power on the few farms on which this has not already occurred. A considerable number of horse-drawn implements are still being used with tractor power. These will be replaced. Much room remains for the mechanization of grassland farming and for the adoption of fertilizer distributors as the process of land intensification takes hold. In addition, it can be expected that in the Prairie region particularly more power-driven machinery will be used. In field operations farm machinery probably will continue to replace men and horses, and machinery purchases over the period are likely to be greater than replacement requirements. Nevertheless, the rate of investment in machinery will be less than that between 1946 and 1955.

On the other hand, the use of electric power on farms to drive small motors in livestock barns has only just begun. This innovation could increase the use of many labour-saving devices in livestock production. The adoption of automatic self-feeding devices for livestock, heated pens for raising young stock, and many small (in terms of investment and size) machines will increase rapidly as the demand for hogs and poultry increases. Ways will no doubt also be found of reducing the labour involved in feeding beef cattle. By 1960 there will be few farms without a source of electric power. The process of rural electrification has lagged behind that in urban areas, and farmers have not thought seriously about the uses to which electricity can be put on Canadian farms. The agricultural machinery industry has been occupied with the task of providing the large field machinery which farmers have been asking for in the last ten years. In the period of the next 25 years, however, more spectacular economies could come about in livestock rearing and feeding through the intelligent application of electric power to farming operations.

### 4. *The Labour Force*

The labour force employed in agriculture cannot continue to decline at the rate at which it has been falling over the last few years. Nevertheless, more economy in labour use can occur and men will continue to be replaced by machines. It is stated above that the impact of mechanization in the future will be less forceful than in recent years. This, in itself, would tend to slow down the rate at which labour will leave farms. At the same time,

the expectation of a large increase in livestock production in the latter part of the 25-year period will tend to offset the benefits from future mechanization. Even though some mechanization of livestock production is possible, it will still require more labour per farm than crop production.

The trend in the domestic demand for food indicates little need for a rapid expansion of output in the next ten years. The adjustments to the recent adoption of farm machinery will probably have considerable effect in that period. It seems reasonable, therefore, to expect a drop in the labour force in agriculture in the next ten years which will be considerably larger than that expected between 1965 and 1980. It is considered likely that the labour force in agriculture by 1965 will have fallen to 733,000 workers, from the level of 817,000 in 1955. This represents a fall of 10% from the 1955 level of employment, which compares with a fall of 31% between 1946 and 1955. Thus it is envisaged that the proportionate drop in employment, although smaller, will still be very considerable.

In the period beyond 1965 it is expected that increases in livestock production, which will bring with them an increase in the intensity of land use, will prevent much further decline in the agricultural labour force. In the period between 1965 and 1980 the mechanization of agriculture is likely to prevent a rise in the use of labour per acre, rather than to reduce the amount required at present. It is, therefore, with the increase in livestock output in mind that a fall is suggested from 733,000 in 1965 to 715,000 by 1980, a drop of only 2.5%.<sup>4</sup>

When this decline in the labour force is related to the drop expected in the number of farms, the pattern which is brought out seems sensible. In 1951 there were 1.5 workers per farm.<sup>5</sup> By 1965 this would fall to slightly less than 1.3 workers per farm, and then, as further consolidation and abandonment continues, there would be a slight rise until 1980, when there would be slightly over 1.3 workers per farm.

Should such a reduction in the agricultural labour force occur, the agricultural industry will be employing a much smaller proportion of all workers employed in Canada. In 1951 it occupied 18.4% of the Canadian labour force, and by 1955 the proportion had fallen to 15.3%. By 1965 the estimates on employment made by the Commission would reduce the proportion engaged in agriculture to 10.8%, and by 1980 it would be only 7.4% of those gainfully employed.

<sup>4</sup> We are quite aware that these estimates of the future size of the farm labour force differ somewhat from those which appear in the main report of the Commission. However, in view of the fact that the differences are relatively minor and that they are the result of entirely independent estimates, it is felt that the above figures should be allowed to stand as a reflection of our uncertainty concerning specific forecasts of the future situation.

<sup>5</sup> This relates the Census of Agriculture number of farms to the Labour Force Survey number of workers.

In Chapter 1 attention was drawn to the fact that the decline in labour employment since 1946 has been greater proportionately in the employment of unpaid family labour than in self-employed or hired workers. There will be constant pressure upon farmers in the future to meet the competitive demands for labour coming from industries producing goods for which the demand is rising at a more rapid rate than the demand for food. It will be more difficult to keep both hired labour and unpaid family labour on the farm because of attractive alternatives in other sectors of the economy. This makes it seem likely that the gap between agricultural wages and working conditions and those in other industries will continue to narrow. The reduction in the farm labour force seems to come about through two main channels. First, there is farm abandonment and farm consolidation reducing the number of farmers themselves. This often reduces unpaid family labour by more than it reduces the hired labour force, because the farms which are forced out of production seem to be those on which family labour is the dominant source of help. The second channel through which reductions in the labour force occur is the replacement of paid labour with machines which reduce the costs of operation.

In the future, the first of these influences is likely to be more dominant than the second. The estimates suggested in this study allow for a decrease of about 60,000 in the number of farms between 1955 and 1980, and for a decrease of 102,000 in the number of workers employed in agriculture. Rising wages in all industries will make it imperative that means be found to raise output per man on farms. But this is likely to be achieved with the greatest success on farms which are now highly commercial. It will be more difficult to mechanize farms on poor land, which are now run without much capital and without much hired labour. It does not seem unreasonable to suppose that 60,000 farmers will move out of agriculture in a period when loss of other workers may amount to only 42,000. If this happens, however, those farmers who remain will need to intensify production so that productivity per man will rise fast enough to hold both family and hired workers in agriculture. The need to do this will become increasingly great as the end of the 25-year period is approached.

### 5. *Livestock*

The livestock carrying capacity of farms has increased considerably faster than farms have increased in size (see Chapter 1). One factor which has been responsible for this is the reduction in horses used for power on farms. Between 1941 and 1955 some five million acres of improved land have been freed for other uses by the replacement of horses by tractors. It seems unlikely that much more than two million acres of improved land can be released for other purposes through the further replacement of horses by machines in the next 25 years.



In addition to this, improved pasture increased in area by almost 18% between 1941 and 1951, and the amount of grain fed to livestock rose from 8.6 million tons to 12 million tons from the average of the crop years 1936-37 - 1940-41 to 1954-55, an increase of 39.5%.

The estimates of domestic demand for livestock and livestock products given in Chapter 2 indicate a production requirement of livestock products in 1965 which is about 38% greater in physical volume than the average of the 1951-55 period. By 1980 the production requirement would be 104% greater than the average level of production of the 1951-55 period.

Technological processes which are likely to increase livestock output per animal on farms and per acre were discussed in the preceding chapter. In what follows the estimated effects of technology outlined in that chapter have been considered as taking effect in each branch of livestock production.

The actual production requirements in terms of animals slaughtered are shown in Table 45. In the converting of the pork, beef, and veal requirements, as estimated in Chapter 2, from pounds of meat on a dressed carcass weight basis to numbers of animals, a weight or yield of meat per animal similar to recent yields was used. No discernible trend in weights of meat per animal is evident from an examination of livestock statistics.

Table 45

A COMPARISON OF ANIMALS SLAUGHTERED IN THE  
AVERAGE OF THE PERIODS 1941-45 AND 1951-55  
WITH THE ESTIMATED SLAUGHTER REQUIREMENTS  
IN 1965 AND 1980

(average of 1941-45 = 100)

	1941-45	1951-55	1965	1980
Hogs .....	100.0	78.0	104.0	167.0
Beef animals .....	100.0	109.5	139.6	225.0
Veal calves .....	100.0	79.5	101.1	106.0

Data for 1941-45 and 1951-55 are from D.B.S., *Livestock and Livestock Products Statistics*, while 1965 and 1980 levels are Commission estimates.

The production requirements for animal products are shown in Table 46.

The assumptions on technology suggested in Chapter 4 would mean that these quantities of meat and livestock products could be produced with annual livestock inventories which would not rise as steeply as the output requirements. With increases in milk output per cow, in egg production per hen and in numbers of animals slaughtered relative to permanent breeding stock, the production capacity of farms for livestock could be con-

Table 46

A COMPARISON OF OUTPUT OF MILK AND EGGS IN THE  
AVERAGE OF THE PERIODS 1941-45 AND 1951-55  
WITH ESTIMATES FOR 1965 AND 1980

(average of 1941-45 = 100)

	1941-45	1951-55	1965	1980
Milk.....	100	94	106	141
Eggs.....	100	120	161	255

Data for 1941-45 and 1951-55 are from *Canada Year Books*, *The Dairy Review*, and D.B.S., *Memo-  
randum on Production of Eggs*. The 1965 and 1980 levels are Commission estimates.

Table 47

LIVESTOCK INVENTORIES AT JUNE 1 FOR THE AVERAGE  
OF THE PERIODS 1941-45 AND 1951-55 AND ESTIMATES  
FOR 1965 AND 1980

(average of 1941-45 = 100)

	Average 1941-45	Average 1951-55	1965	1980
All cattle.....	100	104	116	142
Dairy cows.....	100	86	91	96
Hogs.....	100	75	85	115
Hens.....	100	93	95	120

Data for 1941-45 average and 1951-55 are from D.B.S., *Livestock and Livestock Product Statistics*.  
The 1965 and 1980 data are Commission estimates.

siderably increased. A continuation of recent trends in this direction would produce the comparisons shown in Table 47.

Such increases in livestock production do not appear to be beyond the technical potential of Canadian agriculture. If the estimated changes in land area in farms materialize, they could be accomplished with rather modest increases in livestock inventories; this assumes, of course, that technology is introduced at a rate which increases output per animal as fast as it has in recent years. Our assumptions would require a physical volume of livestock production per acre of improved land in 1965 19% greater than the average of the 1941-45 period and 34% greater than the average of the 1951-55 period. The assumptions on per capita consumption lead to the expectation that most of this increase is required in hog and poultry production which, because these animals are grain-fed, can be expanded rapidly. Technological changes have been most effective in these forms of livestock production in the past, and a continuation of recent trends is highly probable. It is therefore expected that the June 1 inven-

tories of hogs and poultry in 1965 need be only slightly greater than they were in the average of the years 1951-55, and less than in the average of the years 1941-45, when special encouragement was being given to carry livestock on farms.

In the longer run, however, the assumptions regarding requirements for livestock production and land resources imply a considerable degree of intensification of land use and a rise in livestock output per acre which implies much better utilization of land resources than is occurring at the present time.

By 1980, the production of livestock is expected to increase by some 70% in physical volume per improved acre over the 1941-45 average level and more than 90% per improved acre over the 1951-55 level. On the other hand, it is suggested that this can be achieved through the carrying of an inventory of all cattle 36% greater in number than the average of the 1951-55 period. The inventory of hogs is expected to be 50% higher and that of poultry about 38% higher. The increase required in the number of dairy cows would be small.

The impression which the estimates for the period between 1965 and 1980 leaves is that Canadian livestock production will take the form of a more intensive grain-fed operation with a much more rapid turnover of animals for slaughter. This is consistent with the second implication, that producing sufficient pasture for beef animals will be the major difficulty in the period between 1965 and 1980. Western Canada is ideally suited to grain growing and there is considerable room for both expansion and intensification of the output of grain in this region. The requirements in hogs and poultry can be easily produced, because their main feed requirement is grain. It is very probable that they will be produced close to where the grain is grown, thus increasing the importance of these products in Prairie agriculture.

Beef production, however, requires considerable amounts of pasture to graze beef cows and to raise young stock. This is an operation which has been limited up to the present to areas suited to extensive farming, such as the foothills of Alberta, the southern region of Saskatchewan, western Ontario and certain regions of Quebec. Our estimates imply a considerable increase in improved pasture and hay land. At the same time, animals can be fattened at an earlier age with grain, and so a given area of pasture can be utilized to produce a larger number of feeder stock by increasing the rate of turnover. A trend in this direction already exists in western Canada. As the period between 1965 and 1980 passes, it may well be that considerable areas of the more marginal types of land in eastern Canada will be used for beef cattle production through the consolidation of farms. More grassland can also be produced in the moister areas of western Canada through a form of rotation farming, which replaces summer

fallow with forage crops. There is room in all areas of Canada to improve the grasses in pasture already in use and to increase their carrying capacity in this way. In this, perhaps a greater contribution is possible in eastern than in western Canada, but some improvement can occur in all regions. Pasture improvement will likely be the most important means of carrying the cattle which will be required. There is, finally, a largely untouched potential of pasture and hay land in the irrigated areas of western Canada. In the period beyond 1965 such areas may be used increasingly for beef production.

#### 6. *The Future Organization of Farms*

It is now possible to piece together the trends outlined in respect of each of the factors of production. This is valuable for two reasons. It produces an integrated framework to test the consistency of the expectations. It also produces an over-all picture which, if it is logical and consistent, can provide in itself a general view of agricultural development. This may underline the direction in which agricultural production appears to be going and do so more clearly than any individual trends.

On an individual farm basis the trends suggested in the above analysis would produce the organization suggested in Table 48.

**Table 48**

### RELATIVE TRENDS IN CERTAIN ASPECTS OF AGRICULTURAL ORGANIZATION<sup>6</sup>

*(base is 1951 as 100 except for index of physical volume of production which is based on the average of 1947-55)*

	1951	1965	1980
Farm size.....	100	110	116
Number of farms.....	100	91	87
Labour per farm.....	100	84	86
Horses per farm.....	100	33	21
Physical volume of livestock production per farm.....	100	137	212

#### 1947-55

Physical volume of all production per farm.....	100	130	185
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<sup>6</sup> See "special note" page 99.

	1951	Table 48A			
		1965		1980	
		Revised <sup>a</sup>	Original <sup>b</sup>	Revised <sup>a</sup>	Original <sup>b</sup>
Farm size.....	100	116	110	124	116
No. of farms.....	100	87	91	82	87
Labour per farm.....	100	91	84	93	86
Horses per farm.....	100	35	33	22	21
Physical vol. of livestock production per farm.....	100	145	137	224	212
Physical vol. of all production per farm..	100	137	130	195	185

<sup>a</sup> Based on 1956 Census results.

<sup>b</sup> As given in Tables 44 and 48 respectively.



This table suggests certain movements in the organization of agricultural production which are worth elaboration. Between 1951 and 1965 the changes in farm size and in labour and horses per farm are greater than after that date. On the other hand, increases in production per farm for both livestock and for all production are expected to accelerate in the period from 1965 to 1980.

It is useful to compare some relative rates of change. For instance, between 1941 and 1951 farms increased in size by 10% of the 1941 level. In the 15 years from 1951 to 1965 the rate is expected to be 10% of the 1951 level, and in the following 15 years it is expected to be 6% of the 1965 level. The number of farms fell by 54.5 thousand between 1941 and 1951, despite the addition of the farms in Newfoundland. (This was the reduction after making a correction for the change in the census definition of a farm.) Between 1951 and 1965 the reduction expected is 50 thousand, and between 1965 and 1980, 30 thousand. These adjustments, and those in the reduction in the use of labour and horses, illustrate clearly what pattern of farming is expected. In the 15 years between 1951 and 1965 more adjustments in size of business and in the balance between man and machine are expected than in the period beyond 1965. At about that time the rise in the domestic population will have reached a level which will require a considerable increase in the rate at which output per farm rises.

The volume of physical output per farm business increased by 44% in the period from 1941 to the average of the years 1947-55. Our estimates require a further increase of 30% per farm from this level by 1965. But there is a difference in emphasis suggested. Livestock output is expected to rise faster than the rate of all output over the period between now and 1965. By 1955 livestock production per farm (which was at a record level) was already 16% over the 1951 level, and so it does not seem that the 1965 requirement of 30% over the 1951 level will be difficult to achieve. This is especially true when it is remembered that the largest part of that increase is expected in respect of hogs and poultry.

The significance of the rate of change in production is clearer if the production requirements are examined on an acre basis. The trend suggested by the estimates is shown in Table 49.

On an acreage basis the increase in all output required by 1965 is about 20% of the average level between 1947 and 1955. The increase in livestock output required is 39% (of the 1951 level) of which almost 11% had been produced by 1955. If production is maintained and increased from the 1955 peak, livestock output would need to go up by 26% per acre in the next ten years.

In the period beyond that, however, the rate of increase in production per acre would have to be greater, if the domestic demand for livestock and livestock products is to be met from the land resources expected in agriculture.

Table 49

**PRODUCTION REQUIREMENTS PER ACRE**  
*(base for all production = the average of 1947-55  
 base for livestock production = 1951)*

Item	1947-55	1965	1980
Physical volume of all production per occupied acre.....	100	120	162
Per improved acre.....	100	120	158
Item	1951	1965	1980
Physical volume of livestock production per occupied acre..	100	139	204
Per improved acre.....	100	137	196

The remaining comparison which can be made is in output per person employed. The criterion used here is gross output per man. It is not a true reflection of the rate of increase in labour productivity, for it contains within it the influence of increased utilization by those in agriculture of items of production manufactured outside of agriculture. These include such input items as gasoline, fertilizer and processed feeds. On the other hand, it is some indication of whether our production requirements are within the capabilities of the labour force suggested. It can be confidently assumed that those engaged in agriculture will make increasing use of other input items to enable them to produce a higher physical product. The trends which the estimates would bring about are given in Table 50.

Table 50

**VOLUME OF PHYSICAL PRODUCTION PER PERSON EMPLOYED**

	1947-55	1965	1980
Physical volume of all production.....	100	123	196
	1951	1965	1980
Physical volume of livestock production.....	100	165	248

Total physical volume of agricultural production increased per worker from 1941 to the average of the period 1947-55 by 76%. An increase between 1947-55 and 1965 of only 23% should be well within the limits of possibility. The increase between 1965 and 1980 is more than twice this level, being 59%. What this implies, however, is that in this period workers will be using much more capital and handling larger amounts of livestock.

Efficiency in handling livestock will need to be much greater in the period from 1965 to 1980 than anything experienced in the past. Livestock production per person employed in agriculture increased 24% between 1941 and 1951. By 1955, however, livestock production per person was 60% higher than in 1941. The increase required between 1955 and 1965

is just over 27%. This seems well within the realm of possibility. The period between 1965 and 1980 is more difficult to judge, but, given the technological changes expected, the increase in livestock production per man suggested may not be unreasonable.

The general implication of these trends is that by 1980 labour will produce per person about twice the volume of all products produced at the present time. The increase will come almost entirely in livestock and livestock products so that considerably more than twice the volume of these will be produced.

### *III. Some Conclusions and Reservations*

The analysis of prospective demand when interpreted in terms of production requirements seems to suggest that in the next ten years a very moderate expansion is required in the output of Canadian agriculture. The increase in output should, and most likely will, take the form of an increase in grain-fed livestock with a moderate increase in beef output. Not much intensification of land use would be required to achieve the production requirements of 1965. There is every reason to expect that labour will continue to leave agriculture and that farms will continue to grow larger within the next ten years. Although the rate can be expected to be somewhat slower than in the recent period of reorganization, the retardation of the rate of these adjustments will not be as great as it is likely to be beyond the period between 1965 and 1970. A further consideration must be kept in mind. These estimates have been derived without taking into account the influence of the surplus of grain which exists at the present time. If a considerable part of this is utilized in livestock production in the next ten years, even the small increase in output per acre which is suggested could be diminished.

Somewhat beyond 1965, however, the population of Canada will have expanded to an extent which will bring about a fuller use of the land in agriculture. An examination of land resources has led us to the conclusion that the expansion in production is unlikely to occur through a large expansion of the area in farms. The intensive use of the existing land area is only limited by the rate at which costs will rise as output is increased. It is our contention that technological improvement applied to grassland farming and to the breeding and rearing of livestock, along with mechanical improvements in the feeding and handling of stock, can increase output per acre very substantially without raising costs very much.

It is extremely difficult to measure the influence or the result of the application of technical knowledge in agriculture. Even so, many techniques for raising output are already known and can be applied as soon as the demand for farm products is large enough to warrant their use. In considering the amount of intensification of land use which we envisage in

the latter part of the 25-year period, the only process which seems to us to suggest the possibility of a rise in costs greater than the general rise in prices is that of beef production. The limiting factor in beef production is the provision of adequate grazing land and forage crops. Canada does not have large areas of productive grassland, but what is available is being utilized well below its potential carrying capacity. The comparative advantage of the Prairies lies in grain production, but farmers have not gone far in exploring the possibilities of combining grain and forage enterprises to produce beef cattle. It is not surprising, therefore, that no statistical measure can be produced of the future cattle carrying capacity of the land suited to this purpose. It seems more than likely that the increased intensity of land use suggested in this chapter can occur without any great increase in agricultural prices. Beef prices may keep rising slightly faster than the general price level, but as long as incomes rise people will continue to demand more meat per capita, and this will act as a constant incentive to increase output.

It was pointed out in the first part of this chapter that the estimates of demand in Chapter 2 are based on a limited export market for grains other than wheat and for a very limited export of livestock in the form of hog meat to the United States. These assumptions may prove to be in error. If they are wrong, the cumulative effect upon the production pattern could be considerable. Markets for wheat and coarse grains in the Orient, for feed grain in Europe, and for hogs in the United Kingdom are all within the bounds of possibility.

Some qualification of the adjustments just outlined is necessary because of this possibility. Within the next ten years buoyant export markets could have two main effects. First, they might bring about the intensive use of land more quickly than would be expected on the more conservative assumption that no large export markets, apart from wheat, are likely to appear. Second, they might also slow down the rate at which labour is expected to leave agriculture, and maintain a labour force in the industry greater than that forecast in this chapter.

Should such exports continue in volume beyond some period between 1965 and 1970, it can be expected that prices of agricultural products will rise at a faster rate than is anticipated in the forecasts on which this study is based. This will mean that encouragement to increase output at a faster rate will be given through rising profit margins. The application of technology will be stimulated; the use of fertilizers will occur at a faster rate; more attention will be paid to all the scientific methods of increasing output which are already available and new developments will be innovated with greater speed. It might, at some stage, become profitable to develop for farming some of the more inaccessible land in the northern fringe areas of Canada. Some of the withdrawal of land from farming in eastern Canada might be forestalled. In any event, it would still seem unlikely, in the face



of the nature of the remaining land resources in Canada, that much extension of the total area in agriculture beyond that allowed for in the forecasts would occur.

It is our opinion that large and buoyant export markets for the products of Canadian agriculture would simply have the effect of speeding up the process of intensification and, perhaps, slowing down the rate at which labour leaves farming.

Quantitative estimates of the application of technology for the last half of the next 25 years are more difficult to make than they are for the first half. Within the first half, even should strong export markets develop, they would affect the rate of increase in intensity of land use but they would not alter the direction of production. For the last ten years of the period estimates of export markets can only be speculative. All that can be said is that it seems improbable that even by 1980 strong export markets could substantially change the direction in which Canadian agriculture seems to be proceeding. Whatever the total demand for agricultural products in the future may be, it would appear almost certain that it will not be met from an expanding number of farm businesses or a very much larger labour force. The land area in farms could only be increased substantially by incurring costs which would rise steeply as the area in farms increased. Farmers have always responded quickly, and too effectively, to any increase in the price of farm products. Any rise in agricultural prices in the future is likely to stimulate increases in production per acre faster than it will encourage land development and new farms.

Some error is bound to exist also in the forecasts of domestic demand. It is, nevertheless, fairly certain that the direction of change in demand is correct; only the rate of change may be modified. In this respect it seems unlikely that for the next ten years farming will be much different from what our forecasts would suggest. Population and income will rise gradually over the more distant future, thus giving adequate warning of changes in both the quantity and direction of demand.

## FARM CREDIT

GENERALLY speaking credit is used by practically all farmers during a considerable period of their active farming life. The credit the farmer uses is generally classified into three main types: long term, about ten years or longer; intermediate, about three to ten years; and short term, a few months up to two years.

Long-term credit has traditionally been based on the farm real estate as security, either in the form of a mortgage on the farm or the purchase of the land through an agreement for sale, with the title to the farm remaining with the seller until the farm is paid for.

Until the establishment in 1929 of the Canadian Farm Loan Board, a federal government Crown corporation, the long-term farm-mortgage credit field was dominated in western Canada by such private lending institutions as life insurance companies and trust and loan companies. In central and eastern Canada the long-term credit field was dominated by private individual lenders, mostly individuals who lived on farms or in villages and the smaller towns. The typical terms of these mortgages or agreements for sale were for periods of five to seven years with fixed annual payments of principal and a very substantial payment coming due in the last year. The unpaid balance at the end of the five to seven years was often extended as a new mortgage for a further period of five to seven years. Interest rates were commonly quite high, particularly in western Canada, where farmers were required to pay as high as 9% to 12%.

In order to bring mortgage credit terms more in line with the actual ability of farmers to service these loans, some provincial governments introduced provincial government long-term credit programmes. With the exception of the Quebec Farm Credit Bureau, the fairly recently established Ontario Junior Farmer Establishment Loan Corporation and the Nova Scotia Land Settlement Board, all the provincial schemes have ceased operations. These provincial schemes were not successful for a number of rea-

sons, such as poor farm appraisals in relation to land quality, the inability to borrow money at low interest rates, and too high a risk because of geographical limitations in their loaning operations.

Within recent years private lending institutions such as life insurance companies and trust and loan companies have largely withdrawn from activity in the long-term farm mortgage field. This is due partly to the rather sad experience which they had in the depression of the 1930's as a result of provincial and federal farm debt adjustment legislation and partly to the tremendous demand for government-insured housing loans in urban centres.

### ***I. Long-Term Farm Credit***

Exact information for each year is not available with respect to the amount of long-term farm credit advanced by the various credit agencies. However, published reports of the 1941 and 1951 Census of Agriculture provide some indication of the proportion of the total number of mortgages and agreements for sale held by individuals, governments and private institutions (Table 51).

**Table 51**

#### **NUMBER OF FARM MORTGAGES AND AGREEMENTS FOR SALE HELD BY CORPORATIONS, GOVERNMENTS AND INDIVIDUALS**

Census year	Corporations	Governments	Individuals	Total reporting
<b>1941</b>				
Number.....	69,989	70,159	125,272	265,420
Percentage.....	26.4	26.4	47.2	100.0
<b>1951</b>				
Number.....	30,500	65,800	80,000	176,300
Percentage.....	17.3	37.3	45.4	100.0

In 1951 individuals held 45.4% of all the farm real estate mortgages and agreements for sale. The Quebec Farm Credit Bureau operates with a special government-subsidized interest rate of 2½%. For this reason this provincial government long-term credit agency dominates the long-term farm credit field in that province. If we omit Quebec, 49% of all the mortgages and agreements for sale are held by individuals. Corporations such as insurance companies and trust and loan companies in 1951 held only 17.3%.

#### ***1. Canadian Farm Loan Board***

The Canadian Farm Loan Board was established in 1929 under the Canadian Farm Loan Act of 1927. The purpose of the Act was to establish in Canada a federal system of long-term mortgage credit for farmers applicable in all provinces. The Act has been amended from time to time.

The most recent amendments were made in 1956. By these amendments the maximum first mortgage obtainable was raised from \$10,000 to \$15,000. The maximum period of repayment was increased to 30 years

and the loan as a percentage of the appraised value of the farm real estate was increased to a maximum of 65%. The provision for a second mortgage was deleted from the Act.

Another important amendment concerned the method of obtaining funds and the provision of reserves. Up to the present time the Board has set aside each year certain legal reserves from the net earnings of its operations. In addition to these legal reserves the Board has set aside additional reserves for losses. By the recent legislation the Board must turn over to the Treasury any surplus above legal reserves and income tax payments. The amendment Act provides that the Board shall obtain its loaning funds directly from the Treasury without the necessity of selling bonds to the government, which has been the practice heretofore.

Although the Canadian Farm Loan Board has been operating for almost 30 years, it has not developed a dominating position in the long-term farm credit field. It would appear that it has operated as a strictly commercial self-supporting public corporation. Since 1952 it has been required to pay income tax on any profits made.

Generally speaking, the Canadian Farm Loan Board has operated on a fairly cautious basis. Its loaning policy apparently has been based primarily on safety of its capital. Its losses have been practically nil. Appraisals of farm property have been well below current market prices of farms and the average size of loan has been relatively small.

The Board's most active period was during the five years of the depression, 1930 to 1935, when the indebtedness of many farms was refinanced by Canadian Farm Loan Board mortgages (Table 52). During the fall in prices of farm products from 1951 to 1955 the business of the Board again picked up. Some of this increase in business has apparently been due to the refinancing of farm indebtedness.

Table 52

### CANADIAN FARM LOAN BOARD, NUMBER AND AMOUNT OF LOANS APPLIED FOR AND APPROVED <sup>a</sup>

Period	Applications		Loans approved	
	No.	Amount	No.	Amount
1935-36 to 1939-40.....	44,832	\$98,910,000	16,768	\$34,004,000
1940-41 to 1944-45.....	8,016	17,580,000	4,416	9,072,000
1945-46 to 1949-50.....	14,237	40,002,000	7,301	19,325,000
1950-51.....	3,971	11,486,000	1,796	4,722,000
1951-52.....	3,339	10,613,000	1,437	4,238,000
1952-53.....	4,444	17,972,000	1,685	5,852,000
1953-54.....	4,591	19,402,000	2,091	7,817,000
1954-55.....	4,893	20,798,000	2,145	8,225,000
1950-51 to 1954-55.....	21,238	\$80,271,000	9,154	\$30,854,000

<sup>a</sup> *Annual Reports, Canadian Farm Loan Board.*



The average Board loan has always been relatively small and somewhat less than the size of the loan requested (Table 53). For the past five years the number of loans approved has ranged well below 50% of applications. A considerable number of applications are voluntarily withdrawn. Not considering these voluntary withdrawals about 75% of the loans not granted in Ontario in 1955 were refused because of insufficient security.<sup>1</sup> In other words the main reason for the turning down of applications was likely a request for a loan which was more than 60% of the appraised value of the farm. From the farmer's point of view the appraisal was too low. From the Board's point of view the requested loan was too large.

Table 53

CANADIAN FARM LOAN BOARD, AVERAGE SIZE OF LOANS  
APPLIED FOR AND APPROVED AND NUMBER OF LOANS  
APPROVED AS A PERCENTAGE OF NUMBER OF LOANS  
APPLIED FOR <sup>a</sup>

(*average size of loans*)

Period	Applied for av. per year	Approved av. per year	Percentage of no. of loans approved
1935-39 to 1939-40.....	\$2,122	\$1,992	45
1940-41 to 1944-45.....	2,236	2,107	55
1945-46 to 1949-50.....	2,781	2,632	52
1950-51.....	2,892	2,629	45
1951-52.....	3,179	2,949	43
1952-53.....	4,044	3,473	38
1953-54.....	4,227	3,738	46
1954-55.....	4,251	3,835	44
1950-51 to 1954-55.....	3,718	3,322	43

<sup>a</sup> *Annual Reports*, Canadian Farm Loan Board.

One of the criticisms by farmers of the operations of the Farm Loan Board has been its conservative appraisal policy. The Board has followed a policy of attempting to value the farms for loaning purposes on the basis of their so-called long-term earning possibilities. In pursuit of this policy land appraisals in the 1930's were close to market values at that time. As land values rose the Board was apparently reluctant to raise its appraisals in line with rising prices. Consequently appraisals tended to get progressively more out of line with market values, at least up until the summer of

<sup>1</sup> Evidence of F. L. Chester, Commissioner, Canadian Farm Loan Board, before Standing Committee of House of Commons on Banking and Commerce, April 24, 1956.

1954. This policy, although providing greater protection for the Board's capital, tends to provide less service for agriculture and consequently less business for the Board.

No published information is available indicating the actual relation of the Board's appraisals and loans to the market values of the properties mortgaged. However, by assuming that the Board tends to lend to the average farmer and that the average loan is five percentage points below the legal maximum percentage of the appraised value, some useful trends are indicated.

From 1935 to 1952 the loans could not exceed 50% of the appraised value of the real estate. From 1952 to 1956 the legal maximum was 60%. If for the period 1935 to 1939 it is assumed that the average loan of \$1,992 was 45% of the appraised value, then the average appraised value of these loans would be \$4,427. The average estimated value of real estate per farm for Canada for this period was \$4,792. This indicates that the average appraisal amounted to 92% of the average market value. Using the same method of calculation for the other periods we arrive at the following results:

Period	Av. estimated real estate value per farm for Canada	Av. estimated appraisal value	Av. loan value	Estimated appraisal as percentage of market value
1935-39.....	\$ 4,792	\$4,427	\$1,992	92
1940-44.....	4,887	4,682	2,107	96
1945-49.....	6,911	5,844	2,632	84
1951.....	8,603	6,553	2,949 (51-52)	76
1954.....	11,017	6,973	3,835 (54-55)	63

It is not suggested that the above calculations of appraisals as a percentage of market values are highly accurate. However, they do indicate the distinct possibility that the Board's reluctance to raise its farm appraisals has left its appraisals, at least up until 1954-55, considerably lower than the market value of average farm real estate values.

## 2. *Insurance and Trust and Loan Companies*<sup>2</sup>

The above institutions used to be very active in the farm mortgage credit business but, within recent years, they have been comparatively inactive. The decline in the outstanding balances of mortgages held by private institutional lenders from 1951 to 1954 has been accompanied by a corresponding increase in those held by the Canadian Farm Loan Board as is indicated in Table 54.

<sup>2</sup> This section is based primarily upon correspondence with J. E. Fortin, Secretary-Treasurer of the Dominion Mortgage and Investments Association.

Table 54

**AMOUNT OF FARM MORTGAGES AND AGREEMENTS FOR SALE  
OUTSTANDING HELD BY CANADIAN FARM LOAN BOARD AND  
LIFE INSURANCE AND LOAN AND TRUST COMPANIES**

*(millions)*

Period	Private institutions	Farm loan board	Total
1951-52.....	\$36.5	\$29.9	\$66.4
1952-53.....	34.0	31.6	65.6
1953-54.....	31.5	35.2	66.7
1954-55.....	30.4	40.3	70.7
1955-56.....	31.7	N.A. <sup>a</sup>	—

<sup>a</sup> Not available.

NOTE: For private institutions, ends of period are Dec. 31, 1951 to Dec. 31, 1955. For Canadian Farm Loan Board, ends of period are March 31, 1952 to March 31, 1956.

The average farm mortgage loan made by the private lending institutions is considerably larger than loans made by the Farm Loan Board. This may be seen by examining the data in Table 55.

Table 55

**AVERAGE SIZE OF FARM LOANS APPROVED BY PRIVATE  
INSTITUTIONS AND CANADIAN FARM LOAN BOARD**

Farm loans approved by private institutions				Farm loans approved by C.F.L. Board			
	Number	Amount (millions)	Av. Size		Number	Amount (millions)	Av. Size
1951.....	1,064	\$5.5	\$5,169	1950-51	1,796	\$4.7	\$2,629
1952.....	965	5.3	5,492	1951-52	1,437	4.2	2,949
1953.....	820	4.9	5,976	1952-53	1,685	5.9	3,473
1954.....	898	5.3	5,902	1953-54	2,091	7.8	3,738
1955.....	894	6.1	6,823	1954-55	2,145	8.2	3,835

Private Institutional loans are loans approved by members of the Dominion Mortgage and Investments Association which would represent about 95% of all private institutional lenders.

About 55% of the amount of all outstanding private institutional farm mortgage loans is in the Prairie Provinces and 40% in Ontario. Less than 1% is in Quebec and the Maritimes.

At the present time the usual private-institution farm mortgages are for periods of five to ten years with an interest rate ranging from 6½ to 7¼ % depending upon the security and the type of farming. Farm loans range from 45% to 60% of the appraised value of the farm property.

Generally speaking farmers, within recent years, have been able to keep up their payments on their farm mortgages. Private companies up to the end of 1955 did not report any significant increase in arrears of interest or principal. But this is not necessarily a good indication of the present finan-

cial position of farmers. In 1952 private institutions and the Farm Loan Board together loaned \$9.5 million. This increased to \$10.8 million in 1953, \$13.1 million in 1954 and \$14.3 million in 1955. This rise is likely some indication of farmers refinancing part of their short-term indebtedness incurred as a result of falling prices and rising costs since 1951.

### 3. *Veterans' Land Act Administration*

The largest and most active long-term farm credit agency in Canada is the Veterans' Land Act Administration. This is a multi-purpose agency. It acts primarily as an agency for the rehabilitation of veterans of World War II by settling them on full-time commercial farms and on "small holdings" (some of which are part-time farms), and it provides financial assistance and construction guidance for veterans who wish to build their own homes. It also helps to establish veterans as fishermen. It supervises the old accounts of the World War I Soldiers' Settlement Board and its field staff does a certain amount of land appraisal work and provides special reports for other departments of the federal government.

It functions through 257 field areas each of which has a resident field supervisor. There are also 93 construction supervisors. Field supervisors are responsible for sound appraisals of farm properties, selection and purchase of stock and equipment, and for the collection of accounts. They also are required to use every effort, by guidance and advice, to assure the success of the settlers in their respective field areas.

When the veteran signs his settlement contract with the director of the Veterans' Land Act, he agrees to accept the guidance of the director through the field staff of the administration. In actual practice not a great deal of direct guidance has been provided by the field staff as yet. But the field staff itself has been given a considerable amount of training in farm management, technical agriculture, and farm appraisal procedure within recent years with the objective of being of greater service to the veteran settlers. It is now adopting the procedure of holding a number of small meetings in all districts so that the field supervisor may be able to interest settlers in organizing their farm business on a sound economic basis in line with the modern developments in farm practice. The next step in settler guidance and supervision will be closer personal contacts with individuals to help them in planning the organization of their farms with the objective of raising net returns.

The Veterans' Land Act was amended in 1954 to provide for a further measure of financial assistance to farmer veterans. At present a full-time farmer veteran may receive financing assistance up to a maximum of \$9,300, of which only \$6,200 is repayable provided the veteran waives his re-establishment credit or if, having already received it, he pays back this sum to the director of the Veterans' Land Act before he enters into his contract.



The following tabulation indicates the calculations in arriving at the above amounts of assistance.

Veterans' Land Act	Veteran pays	Veterans' Land Act advances	Total	Veteran repays	Terms	
Part I						
Real estate.....	\$ 480	\$4,320	\$ 4,800	\$3,200	3½%	25 years
Livestock and machinery.....	—	1,200	1,200	—	—	—
Part III						
Real estate.....	1,500	3,000	4,500	3,000	5%	25 years
Totals.....	\$1,980	\$8,520	\$10,500	\$6,200		

The conditional grants under Part I of the Act total \$2,320 (\$1,200 livestock and machinery and \$1,120 re-establishment credit) which the veteran does not have to repay provided he stays on the farm for at least ten years. The combined annual payments total \$407.07 on an amortized basis.

The volume of advances to veterans made by the Veterans' Land Act Administration is large and still growing, although at a slower rate than formerly. Within recent years advances have averaged more than \$20 million a year. Total administrative costs have increased remarkably little in view of the increase in the volume of outstanding loans and the increase

Table 56

**STATEMENT OF EXPENDITURES, ADMINISTRATION COSTS,  
RECEIPTS, AND OUTSTANDING INDEBTEDNESS VETERANS'  
LAND ACT 1949-50 TO 1955-56 <sup>a</sup>**  
(*millions*)

Fiscal year	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56
Total advance to date.....	\$210.8	\$235.9	\$258.1	\$278.7	\$299.1	\$320.6	\$343.6
Total advances by years.....	31.1	25.2	22.1	20.7	20.4	21.6	23.0
Total outstanding.....	175.5	191.7	203.0	211.2	220.0	229.7	235.2
Total receipts principal and interest to date.....	43.3	56.1	71.7	89.3	105.9	123.2	141.9
Total receipts principal and interest by years.....	12.0	12.7	15.7	17.6	16.5	17.3	18.7
Administration costs incl. house construction.....	4.5	4.4	4.4	4.5	4.5	4.8	4.9
Administration costs as percentage of outstanding advances.....	2.54	2.30	2.18	2.14	2.07	2.08	2.06

<sup>a</sup> Data as supplied by Chief Treasury Office, D.V.A.

in services provided, such as the veterans' house construction programme. Administrative costs have gradually fallen to about 2% of outstanding advances. In view of all the services for veteran full-time farmers, small holders, veterans' housing construction, and miscellaneous work for other government departments, this ratio would appear to be very satisfactory.<sup>3</sup>

The Veterans' Land Act was amended in 1954 to provide for a maximum additional loan of \$3,000 (Part III). The Canadian Farm Loan Board may now lend up to a maximum of \$15,000, but the veteran cannot take advantage of this because of the Veterans' Land Act mortgage on his farm. It would seem logical that the Veterans' Land Act should again be amended so that the administering agency would be in a position to render more service to veterans by providing additional long-term credit. If farmer veterans are to continue to increase their output per man they will need to enlarge the size of their farm enterprise, either by more intensification or by enlarging the farm area. The organization of the Veterans' Land Act Administration with its well-trained staff of farm advisers is admirably suited to provide an expanding supervisory service to all farmer veterans, including those who may wish to expand the size of their farm operations with the aid of more long-term credit.

#### 4. *Quebec Farm Credit Bureau*<sup>4</sup>

The Quebec Farm Credit Bureau Act was passed in 1936. The Act made provision for long-term farm loans at a low rate of interest. The loans are for three main purposes:

- (1) To establish young farmers on their own farms.
- (2) To enable established farmers to refinance mortgages and other indebtedness.
- (3) To enable established farmers to improve the general efficiency of their farming operations.

The loaning funds of the Bureau are usually obtained annually, or whenever there is need, by vote of the Quebec Legislature. The terms of the farm mortgages are 2½% interest with a maximum loan of \$7,000 repayable in 39½ years. The interest and principal payments are amortized and the annual combined payment amounts to 4% of the original loan.

The Bureau is very active. Up to December 31, 1954, it had lent \$114,447,570 compared with \$99,755,195 lent by the Canadian Farm Loan Board in all Canada up to March 31, 1955. Of the total loans to date, \$54,989,000 has been in loans to establish farmers' sons. There has

<sup>3</sup> The 1954-55 *Annual Report* of the Canadian Farm Loan Board shows a total investment in real estate loans of \$40,277,496 as at March 31, with total administrative costs for the year of \$609,089 or 1.51% of the amount of the loans.

<sup>4</sup> This section is based on annual reports of the Quebec Farm Credit Bureau.

been a remarkable increase in establishment loans, rising steadily from \$1,639,250 in 1945 to \$8,108,150 in 1954. The average age of farmers' sons obtaining loans during the period from 1937 to 1954 was 38 years.

The general operations of the Bureau have been very successful, partly owing to the relatively low interest rate and partly owing to a strict system of collections. During practically every year, unless economic conditions were very poor, the Bureau has received as much in advance payments as it has in regular contractual payments. In 1954, for instance, it received \$1,600,000 in contractual payments and \$1,900,000 in advance payments.

The losses from 1937 to 1954 have only amounted to about \$700. Administrative costs usually amount to slightly more than 0.5% of the outstanding loans.

Since 1951 the total amount of outstanding loans advanced by the Quebec Farm Credit Bureau as of December 31, is as follows:

1951 .....	\$ 81.6 millions	1954 .....	\$ 107.8 millions
1952 .....	88.6 millions	1955 .....	120.3 millions
1953 .....	97.4 millions		

#### 5. *Ontario Junior Farmer Establishment Loan Corporation<sup>a</sup>*

The Ontario Legislature passed the Ontario Junior Farmer Establishment Loan Corporation Act in 1952. The Corporation started operations in October, 1952.

The Corporation membership comprises a directorate of three Ontario Civil Servants. Its loaning funds are obtained mainly by the sale of debentures and treasury bills. Costs of administration are paid out of the Consolidated Revenue Fund.

The main purpose of the Corporation is to make loans to young Ontario farmers so that they may become established on their own farms. The security is a first mortgage on the farm real estate. To qualify for a loan the young farmer has to have a minimum of three years' farming experience in Ontario and be not less than 21 nor more than 35 years of age.

The farm real estate is appraised by part-time appraisers on a per diem basis. The loan may be as high as 80% of the appraised value and repayable in a period up to a maximum of 25 years. The interest rate is currently 4%. From October, 1952 to April 1, 1956 the Corporation approved 1,763 loans and lent \$11,849,551, an average of \$6,721 per loan. This is almost twice the size of the average approved Canadian Farm Loan Board loan.

<sup>a</sup> This section is based on correspondence with J. O. Fraser, Manager of the Ontario Junior Farmer Establishment Loan Corporation.

The activity of the Corporation, as indicated by the growth of the amount of the outstanding loans since 1953, is as follows:

		Outstanding Loans	
		Number	Amount
March 31, 1953		202	\$ 1.3 millions
"	1954	612	3.8 "
"	1955	1090	6.9 "
"	1956	1564	10.3 "

#### 6. *Nova Scotia Land Settlement Board*<sup>6</sup>

The Nova Scotia Land Settlement Board operates under the Land Settlement Act of 1932, which has since been amended a number of times. It is primarily for the purpose of assisting the settlement of young farmers and immigrants rather than for farmers who are already established.

The farm lands are usually purchased by the Board and then sold to the settler on the basis of an agreement for sale. The title remains with the Board until the settler makes his final payment, at which time the title is transferred.

The settler has to put up one-third of the cost of the farm. The Board advances two-thirds. The maximum loan is now \$10,000 for an individual, \$14,000 for two partners or \$21,000 for three partners, the partners being father and sons. The loan cannot exceed two thirds of the appraised value of the farm.

Borrowers' lives are insured under a group insurance plan for the full unpaid balance of the loan. In the case of death the loan is automatically paid off. The cost of this insurance is \$4.80 per \$1,000 per year and is payable annually on the value of the original loan.

All loans are made on the amortization repayment plan for periods of 10 to 25 years, either on a yearly, half-yearly, or monthly payment basis. The interest rate is currently 4½%. On a 25-year amortized basis the total of interest, principal, and group insurance premium payable per year amounts to \$72.24 per \$1,000 of loan.

Since 1951 the Board has granted the following loans:

		Number	Amount			Number	Amount
1951	119	\$ 291,000		1954	135	\$ 333,000	
1952	110	279,000		1955	126	370,000	
1953	129	326,000					

<sup>6</sup> This section is based on literature of the Nova Scotia Land Settlement Board and correspondence with S. E. Lewis, Director of Immigration and Land Settlement Services.



The balance of loans outstanding since 1951 was as follows:

Year ending March 31

1952 .....	\$ 948,000	1955 .....	\$ 1,498,000
1953 .....	1,136,000	1956 .....	1,692,000
1954 .....	1,307,000		

### 7. Private Lenders

No published data are available with respect to the activity of private lenders of long-term farm credit. However, the 1951 census reported that 45.4% of all the farm mortgages and agreements for sale were held by individuals.

If we assume that this percentage has not changed since 1951 and that the average private mortgage is the same size as the average government and private institutional farm mortgage, then we can estimate the total of private individual mortgages and agreements for sale. Table 57 brings together the totals of outstanding long-term credit for the various agencies from 1951 to 1955.

Table 57

## TOTAL OUTSTANDING FARM MORTGAGES AND AGREEMENTS FOR SALE AT END OF FINANCIAL YEAR

(millions)

	1951	1952	1953	1954	1955
V.L.A.....	\$191.7	\$203.0	\$211.2	\$220.0	\$229.7
Que. F.C.B.....	81.6	88.6	97.4	107.8	120.3
C.F.L.B.....	28.5	29.9	31.6	35.2	40.3
Ont. J.F.L.C.....	—	—	1.3	3.8	6.9
N.S.L.S.B.....	0.7	0.9	1.1	1.3	1.5
Total government.....	302.5	322.4	342.6	368.1	398.7
Ins. trust and loan.....	36.5	34.0	31.5	30.4	31.7
Total excl. individuals.....	339.0	356.4	374.1	398.5	430.4
Individuals.....	281.4	295.8	310.5	330.8	357.9
Total.....	\$620.4	\$652.2	\$684.6	\$729.3	\$788.3

Under the above assumptions the long-term farm mortgage credit held by private individuals has increased from \$281 million in 1951 to \$358 million in 1955.

It is common knowledge that a considerable portion of this individual long-term credit is in the form of agreements for sale or mortgages held by retired farmers as a result of selling their farms.<sup>7</sup> These retired

<sup>7</sup> It was found that 42% of all the original farm mortgages made during the period 1941 to 1950 in a sample of eight counties of Ontario were held by the original sellers. *Farm Title Transfer Survey, 1900 to 1950*, Farm Economics Branch, Ontario Department of Agriculture.

farmers sell their farms to sons or other individuals and often obtain only a small down payment. The terms of sale are quite varied. In some cases all the father requires is an annual interest payment during his lifetime. In other cases he may require interest and a small principal payment. However, upon the death of the father, the son will have to refinance his mortgage in order to pay off the other heirs. A considerable amount of business of the Canadian Farm Loan Board is the result of this type of mortgage refinancing.

## *II. Intermediate Credit*

Practically all the intermediate credit used by farmers in Canada is now obtained through federal government guaranteed bank loans to farmers. These guaranteed loans are advanced by the banks in accordance with the rules and regulations of the Farm Improvement Loans Act as enacted by Parliament in 1944.

The broad purposes of the Act are to enable farmers to improve and develop their farms and improve the living standards of the farm family. Specifically, the guaranteed loans cover the expenditures for such things as farm machinery, drainage, land clearing, farm trucks, livestock, and improvements to the farm home, including electrification, heating systems, water systems and refrigeration.

In the purchase of capital items and improvements the farmer is required to make the following payments from his own resources:

	Percentage of cost		Percentage of cost
New machinery	33%	Electric systems	25%
Used machinery	40%	Drainage and fencing	25%
Livestock	25%	Plumbing and heating	10%
Construction and repair of buildings	10%	Irrigation and land clearing	25%

Farm machinery loans are repayable in three years. Other loans are repayable from 18 months for a \$400 loan up to a maximum of ten years for a \$5,000 loan. The maximum outstanding balance at any time of any one of these guaranteed loans or number of loans cannot exceed \$5,000.\* The current rate of interest is 5% simple interest.

The loans are made by the branches of the chartered banks which are guaranteed by the government against losses up to 10% of the aggregate principal amount of the loans made by each individual bank. This system

\* From 1944 to 1952 the maximum amount which could be borrowed was \$3,000. In 1953 the Act was amended raising the maximum to \$4,000. An amendment in 1956 raised the maximum to \$5,000.

of intermediate credit has been very successful and has probably been a major factor in improving the productivity of agriculture and the general well being of farmers and their families. The claims paid by the government to the banks as a result of the guarantee up to December 31, 1955, have only amounted to \$285,000. During this same period total loans made under Farm Improvement Loans legislation have amounted to \$585,712,168.

Of the total loans made approximately 88% were for the purchase of farm machinery, 6% for construction and repairs of buildings, 3% for livestock, 2% for general farm improvements including land clearing and 1% for farm electric systems, fencing, and drainage. The growth of the amount of Farm Improvement Loans outstanding as at December 31, was as follows:

1946 .....	\$ 8.1 millions	1951 .....	\$102.7 millions
1947 .....	16.0 "	1952 .....	122.7 "
1948 .....	26.1 "	1953 .....	138.1 "
1949 .....	44.4 "	1954 .....	130.4 "
1950 .....	73.4 "	1955 .....	133.2 "

### III. Short-Term Credit

#### 1. Bank Credit

The branch banking system of Canada is well suited to service the short-term current financing needs of farmers. Farm production in Canada is highly seasonal in character and farmers are typically important users of short-term bank credit to finance their seasonal farm operations.

These current bank loans, which are considered by the banks as quite distinct from Farm Improvement Loans, may take the form of demand notes or short-term notes of a few months up to a year or a little longer. The security for these loans varies. Sometimes it is life insurance policies, or chattel liens on livestock, crops or machinery. Sometimes no particular security is required other than the personal signed note of the farmer.

Table 58 shows the growth of short-term bank loans to Canadian farmers since 1935.

Table 58

### OUTSTANDING BANK LOANS TO FARMERS <sup>a</sup> (millions)

1935-39 (average).....	\$ 57.0	1953.....	\$195.4
1951.....	175.2	1954.....	208.1
1952.....	185.4	1955.....	232.9

<sup>a</sup> Excluding farm improvement loans. Bank of Canada, quarterly classification of bank loans, 1935 to 1939 as of October 31, 1951 to 1955 as of December 31. Farm Improvement Loans were subtracted from Bank of Canada data to obtain current operating loans as above.

## 2. *Credit Unions*

Essentially a credit union is a group of people with a common bond of occupation or association who band together for the purpose of pooling their savings and lending to their members. Generally speaking, credit unions make short-term loans for periods varying from a few months to about a year for what is called "provident and productive purposes". As a rule they do not lend to members on long-term mortgages. The exception to this rule is in the province of Quebec, where lending on mortgages, chiefly for home building in towns and villages, is quite common.

Credit unions are organized both on a rural and urban basis. Official statistics of credit union activity do not provide an exact breakdown of unions whose membership is strictly composed of farmers. Nor are there exact data available as to the purposes for which loans are granted. Consequently the following attempt to indicate the amount of short-term credit supplied by credit unions to farmers for productive purposes yields only approximate results.

Table 59 shows the total current loans to members of credit unions outstanding at the end of each year since 1951 and an estimate of these loans to farmers.

Table 59

### TOTAL CREDIT UNION LOANS EXCL. MORTGAGE LOANS TO MEMBERS AND ESTIMATES OF THESE LOANS MADE TO FARMER MEMBERS <sup>a</sup> (millions)

	Total short-term loans	Estimated short-term loans to farmers
1951.....	\$ 85	\$44
1952.....	106	52
1953.....	139	64
1954.....	145	62
1955.....	181 <sup>b</sup>	72

<sup>a</sup> *Credit Unions in Canada*, Annual Reports, Marketing Service, Canada Department of Agriculture.

<sup>b</sup> Preliminary.

In addition to the above loans, credit union mortgage loans outstanding ranged from \$104 million in 1951 to an estimated figure of \$196 million in 1955. These were practically all for building homes in villages and towns.

About 52% of all credit unions in 1951 were rural unions. This percentage has been falling and now only about 40% of all credit unions are classified as rural. These declining percentages were applied to total current loans to arrive at an estimate of current loans to farmers.

The data in the above table suggest that farmers in the aggregate obtain about one-quarter of their current loans for farm operations through



the credit unions. In 1955 estimated credit unions' short-term loans amounted to about 24% of the total combined credit unions and current bank loans to farmers.

### 3. Merchant Credit

An important source of short-term credit for farmers is that provided by the retail merchants by means of charge accounts for such items as feeds, seeds, fertilizer, gas and oil, hardware, repairs for farm machinery and autos, lumber and fencing materials. What really amounts to short-term credit is sometimes obtained from the local municipality through non-payment of farm taxes for a year.

Interest and penalties are charged on tax arrears. Merchants do not usually charge interest on overdue accounts but sometimes they may require the farmer to sign a note for his past-due accounts. The merchant will discount the note at the bank and in such cases the farmer pays interest on these overdue accounts.

No records are available as to the aggregate amount of merchant credit used by farmers but, from common knowledge, it is considerable. It is believed that a conservative figure of aggregate merchant credit and farm tax arrears would amount to about half that of current bank loans to farmers. Applying 50% to our total for current bank loans provides the estimated totals for merchant and municipal short-term farm credit shown in Table 60.

Table 60

#### ESTIMATED TOTAL MERCHANT CREDIT AND REAL ESTATE TAX ARREARS AS AT THE END OF THE YEAR

(millions)

1951.....	\$88	1954.....	\$104
1952.....	93	1955.....	116
1953.....	98		

### IV. Summary of Long-Term, Intermediate and Short-Term Credit

It will be noted that the analysis of the different kinds of credit up to this point has been partly based on some necessary assumptions where direct and exact information was not available. The reader should, therefore, bear these assumptions in mind when considering the following brief discussion of the over-all farm credit picture.

Table 61 sets out the estimates of the three types of farm credit from 1951 to 1955.

Table 61

ESTIMATES OF TOTAL LONG-TERM FARM MORTGAGE AND  
AGREEMENT FOR SALE CREDIT, INTERMEDIATE CREDIT AND  
SHORT-TERM CREDIT, OUTSTANDING AT THE END OF  
THE FINANCIAL YEAR

(millions)

	1951	1952	1953	1954	1955
Long-term mortgage.....	\$ 620.4	\$ 652.2	\$ 684.6	\$ 729.3	\$ 788.3
Intermediate.....	102.7	122.7	138.1	130.4	133.2
Short-term.....	307.2	330.4	357.4	374.1	420.9
Total.....	\$1,030.3	\$1,105.3	\$1,180.1	\$1,233.8	\$1,342.4
Increase from previous year.....		\$ 75.0	\$ 74.8	\$ 53.7	\$ 108.6

For the four years 1951 to 1955, the average annual increase in long-term credit was \$42.0 million, short-term credit \$28.4 million and intermediate credit \$7.6 million, a total of \$78.0 million a year. The percentages of the three types of farm credit since 1951 were as shown in Table 62.

Table 62

PERCENTAGES OF ESTIMATED TOTAL OF FARM CREDIT  
BY TYPE, 1951-55

	1951	1952	1953	1954	1955
Long-term.....	60.2	59.0	58.0	59.1	58.7
Intermediate.....	10.0	11.1	11.7	10.6	10.0
Short-term.....	29.8	29.9	30.3	30.3	31.3
Total.....	100.0	100.0	100.0	100.0	100.0

About 60% of the total farm credit is long term, 10% intermediate, and 30% short term. There has apparently been a tendency for the relative importance of long-term credit to decline slightly. Intermediate credit increased in importance and then receded. Short-term credit has increased slightly but persistently in relative importance.

**PART II**  
**REGIONAL STUDIES**





## THE ATLANTIC REGION

IN VIEW of the pronounced differences which exist in the stages of agricultural development, types of farming, farming methods and general agricultural conditions in the four Atlantic provinces, it appears desirable for analytical purposes to consider separately the agricultural situation in each of three sections of this total area. To this end we shall examine in turn the agriculture of Newfoundland, of Prince Edward Island, and of Nova Scotia and New Brunswick combined.

### *I. Newfoundland Agriculture*

Agriculture developed slowly in Newfoundland mainly because settlement was deliberately discouraged and because agricultural resources were extremely uninviting whereas fishery resources were exceedingly good. Until recent years agricultural activity has been of the self-sufficing sort, designed to supplement the income from fishing during a period when the people had to be satisfied with a subsistence living standard. More recently, as urban markets and employment opportunities have increased, this supplementary and non-commercial agriculture has been disappearing, while the purely commercial type has been gradually expanding.

That commercial farming is still relatively undeveloped, however, is shown by a variety of circumstances. For one thing it is only within very recent years that any really serious effort has been made to determine the location, extent and actual nature of the land resources, and much remains to be done in this connection. Moreover, of the suitable land that is known to be available, only a part has been occupied to date. Of that which was occupied, only a third was improved by 1951.<sup>1</sup> Another indication of the early stage of development is the failure, thus far, to make satisfactory provision for securing and transferring titles to farm properties. Still another indication is the fact that many people are still able to make free and

<sup>1</sup> *Census of Canada, 1951, Vol. VI, Pt. 1.*

common use of large areas of Crown lands for pasturing livestock and other purposes. Other signs of immaturity include the continued use of two-wheel carts by over 70% of the farms and the generally unmechanized character of all but the small number of relatively larger ones, the large room for improvement in the types of livestock, and the widespread lack of modern technical agricultural knowledge as reflected in some of the farming practices. Finally, the very fact that land clearing and general reclamation is such a major part of the total agricultural activity and that it is still taking place on even many of the older and better developed farms indicates that farming is only becoming established.

Closely related to this relative immaturity is the small scale of most of the farm units. Of the 3,626 farms reporting in the 1951 census, no less than 2,831 had under 9 acres of improved land, and 499 had actually less than 3 acres improved. Indeed there were only 22 farms with more than 70 improved acres.<sup>2</sup> Equally striking is the fact that for 78% of the farms the value of products sold per farm was under \$250. In contrast, however, each of 197 farms sold over \$2,500 worth, while in the case of a few farms the sales value actually exceeded \$20,000.<sup>3</sup>

### *1. Type of Farming Trends*

In all but a few cases commercial farming in Newfoundland is equivalent to the growing of vegetables. The amount of land per farm has usually been so limited that it was impossible to make any kind of a living from it unless it was used to produce something of a high per acre value. Moreover, even when land was so used, it did not yield much net income unless large amounts of the relatively less expensive production factors were combined with each unit of the extremely scarce land so as to obtain fairly good yields. It was thus necessary to grow intensive crops intensively.

Additional reasons for the pronounced concentration on vegetable production include the following: (1) it required far less capital than types of farming involving the purchase of livestock and the construction of buildings; (2) it has been found that vegetable growing is specially suited to Newfoundland climatic conditions; (3) vegetable growing is the only kind of farming that the average person has had much knowledge about; (4) experience has shown that this line of production offers the best hope of success in meeting outside competition; (5) the seasonal nature of the enterprise makes it possible to combine it with non-agricultural activities; and (6) this type of farming has proved most satisfactory from the standpoint of economic returns.

Despite these advantages, vegetable farming has some definite limitations. Complete concentration on vegetable growing makes it difficult to

<sup>2</sup> *Census of Canada, 1951*, Vol. VI, Pt. I, *Newfoundland*, Table 16.

<sup>3</sup> *Census of Canada, 1951*, Vol. VI, Pt. I, *Newfoundland*, Table 25.

follow scientific rotations and maintain soil fertility. In addition it does not provide continuous year-round employment. This is especially serious where non-farm work cannot be obtained and where the scale of vegetable growing is such that hired labour is necessary. Because of these disadvantages there has recently been a fairly general tendency to combine one or more livestock enterprises with vegetable growing as additional land and capital and nearby markets become available. Such a shift has been taking place in the more established areas for years and is gradually getting under way in the newer settlements as well.

In addition to the types of farming just mentioned there are a limited number of farms which are devoted largely, if not entirely, to the specialized production of whole milk or poultry products. Most of them are within a few miles of either St. John's or Cornerbrook. In all but a few cases, however, the so-called specialized dairy farms produce considerable quantities of vegetables as cash crops. On the other hand most of the specialized poultry farms rely almost entirely on the production of eggs and, to a much lesser extent, on poultry meat. The development of these poultry farms, which began only a few years ago and is now rapidly expanding, represents an attempt to take advantage of newly created markets and federal government assistance in transporting feed grain and to discover a type of farming that can be undertaken successfully with a minimum of land.

Apart from the types already indicated, Newfoundland farms may be classified as full-time or part-time undertakings. It is particularly significant that no less than 2,278 of the 3,626 farm operators listed in the 1951 census reported work done off the farm in 1950. The actual amount of non-farm work varied considerably. At one extreme were 18 operators each of whom did less than 7 day's work off the farm, while in the case of 621 others the amount of off-farm work varied between 229 and 365 days. In addition to this work, which is done for wages off or away from the farm, there are many cases where much of the work done consists of woods operations on the farm or fishing operations adjacent to the farm. That these types of activity provide a significant part of the total income is clearly shown in information collected from 279 farm operators in different sections of the province in 1953.<sup>4</sup> The average 1952 income of these farmers included \$610 from woods operations on their own farms, \$81 for woods work done elsewhere for wages, \$182 for other non-farm wage work, \$37 from fishing, and \$104 from various other types of non-farm self-employment, or a total of \$1,014 apart from their returns from ordinary farming operations. These figures substantiate the general statement that it is really only in the longer settled St. John's district that one finds people

<sup>4</sup> Data collected in connection with a study of current economic conditions in Newfoundland Agriculture instituted by the Economics Division, Canada Department of Agriculture, in June, 1953.

relying entirely on the production and sale of farm products for a living. In most other areas, and especially on the western side of the island, woods operations provide the main winter employment and a very significant part of total income.

## 2. *Physical Limitations*

Physical conditions have exerted and must continue to exert a dominating influence on the nature and extent of agricultural development. The short, cool, and relatively moist summers with comparatively little sunshine make it impracticable to grow crops which require either plenty of warmth or a fairly lengthy frost-free growing period. On the other hand, crops like turnips, cabbage, and potatoes, which prefer a moist, cool climate, do extremely well. The combination of sufficient moisture and moist, cool air is also particularly well suited to the growing of hay and pasture crops. On the other hand, the lack of warm, dry weather adds to the difficulty of curing the hay crop. Finally, it is important to note that the extremely short summers make for an abnormally long winter-feeding season for livestock.

Far more important than any climatic limitations are those which result because land is extremely limited in quantity and poor in quality. Roughly three-fifths of the total area of the island consists of barren lands, bog lands in various stages of decomposition, and innumerable lakes. And, of the remaining two-fifths, all but a small part is in forests of varying quality. This means that there is only a very limited part of the total area which might be considered as suitable for agriculture. Moreover, a very large part of this limited area consists of relatively small patches which are often widely separated. It is only in a few areas that any real continuity of settlement is possible. This condition naturally results in extremely high costs of administering agricultural programmes as well as high marketing costs. It also makes for local as distinct from provincial farmer organization and solidarity. Furthermore, the pocket-like distribution of the land is in many cases so pronounced that settlement cannot take place without resulting in excessive cost of road construction, social isolation of the farm families, and extreme difficulty in obtaining and maintaining schools, churches and other social services.

This limited amount of farmland is also of a relatively poor quality. The soils are relatively youthful and shallow. Moreover, the humid, continental, short-summer-season climate together with the coniferous vegetation which is associated with it have produced podzolization in almost all cases. Most of the soluble mineral elements as well as the organic matter have been removed from the topsoil and deposited in the subsoil. This leaching process and the lack of limestone in the underlying rocks have produced a universal condition of strong acidity in the soil. In most regions, also, the soils are extremely stony both on and under the surface. More-



over, the land surface is usually distinctly hilly. It is seldom indeed that level fields of any size can be obtained. The combination of rolling topography and stoniness results in extremely high clearing costs; the poor quality of the soil makes for high cost of liming and fertility maintenance; and the small, irregular, and often hilly nature of the fields makes it virtually impossible in most cases to use modern farm equipment efficiently.

### 3. *Land Area and Development*

When the 1951 census was taken there were 3,626 occupied farms in Newfoundland. They represented a total area of 85,040 acres. Of this only one-third was improved. Thus the average farm contained slightly over 23 acres of which less than eight acres was improved. Since 1944 government-owned bulldozers with various kinds of attachments have been made available to farmers at low cost for land-clearing purposes. This type of assistance has constituted a major part of governmental agricultural activity and each recent year has seen around 1,000 acres added to the improved acreage by this means. Recent experience has made it obvious that with farm wages at current levels practically no land would be cleared in the absence of such a government-supported programme. However, it is hardly to be expected that such a programme will be continued indefinitely or that the annual rate of clearing will be any greater in the future than in the past. In any case, there is relatively little additional land that is suitable for farming and sufficiently accessible to warrant clearing.

### 4. *Some Further General Considerations*

An analysis of the Newfoundland situation suggests that there is particular need for the general farming pattern to conform to the specific character of the agricultural resources. Fur farming, poultry farming, and vegetable and small fruit production are indicated, rather than dairy farming or beef cattle and sheep production. Commercial dairying appears feasible only to the extent that production is limited to the amount of whole milk that can be sold at exorbitant prices. And, even though considerable free summer pasture on Crown lands remains unused, the beef cattle and sheep enterprises are prevented from expanding because the growing of winter feed represents a too extensive and therefore a too expensive use of cultivated land.

While there is every indication that the major part of Newfoundland's food requirements will continue to be met by means of importation, there can be little doubt that a substantial and, probably, a gradually increasing amount of agricultural activity will take place in the island during the next quarter century. This seems likely for several reasons. Fur farmers are not dependent on the nature of the land resources and can obtain the basic feeds (whale meat and fish offal) more cheaply in Newfoundland than elsewhere. Poultry farming costs tend to correspond with those in

competing provinces since there is little dependence on the nature of the land resources while the poultry feed is transported almost free by virtue of the current federal government freight assistance programme. Since vegetable and small fruit production requires comparatively little land and yields a large dollar return per acre, it can often be profitable despite high land-clearing, liming, and fertilizing costs. Because large areas of barren lands can be used as free summer pasture without incurring these costs, a limited amount of beef cattle and sheep raising can be and is being profitably undertaken. There is also some possibility that a current bog reclamation research programme will lead to reasonably low-cost production of winter feed and thus remove the real obstacle to efficient production of livestock and livestock products. The high Newfoundland prices which result from the significant degree of natural protection against imported products act as an offset to the high costs of many Newfoundland farmers. It must be recognized that a significant part of the island's food is being profitably produced in Newfoundland at present. Moreover, part-time farming provides supplementary employment and income in isolated places where other types of employment are unavailable on a full-time basis. Finally, there is the fact that local production tends to improve the quality of the protective and more perishable foods and reduce the irregularity of food supply which is associated with importation.

## *II. Agriculture in Prince Edward Island*

Though its total area and therefore its agricultural potential is distinctly limited, no province in Canada depends as completely on agriculture as Prince Edward Island. Agriculture is basic to the province's economy partly because the resources are relatively suitable for agricultural production and partly because non-agricultural resources are practically non-existent. Despite a gradual decline from the high point of 87% in 1921, the occupied farming area was still 78.4% of the total area of the province in 1951. And, despite a recent significant decline in the number and percentage of the people living on farms, the farm population was still 47.6% of the total in 1951.

### *1. Land Area and Development*

While most of the total area of the province is represented by occupied farms, a large fraction of the average farm is uncleared and generally unimproved and therefore quite unsuited for ordinary farming. Whereas the total acreage in farms made up 78.4% of the provincial land area in 1951, only 46% of this area was represented by improved farmland. The area of improved land continued to expand until 1911, since when it has contracted considerably and at an increasingly rapid rate. It is particularly significant that almost three-quarters of the total contraction occurred between 1941 and 1951. While this reduction was occurring, the unim-

proved part of the farming area, instead of contracting, actually expanded to the extent of some 16,000 acres. These shifts suggest that a considerable number of farmers have continued to occupy and operate their farms while letting part of their improved farm area reforest itself. But while some of the reduction in the improved acreage has occurred on the occupied farms, the greater part of it has been reflected in outright farm abandonment. Farms were abandoned primarily because the operators found it impossible to obtain a satisfactory living from farming. Their income was insufficient either because they had too poor or too little land or because they were not good enough farmers. There is conclusive evidence that many farms had to be abandoned because they were too small. In 1941, for example, the abandoned farms had an average of only 27 acres of improved land compared with 63 acres in the case of the farms that were still occupied. Moreover, the abandoned farms were more or less concentrated in districts where the quality of the soil was distinctly inferior.<sup>5</sup>

It is generally agreed that at least some of the abandoned land should never have been cleared. On the other hand it is claimed that many of the farms vacated during the last 10 or 15 years are of excellent quality and that they were abandoned because it was impossible to get enough labour to operate them, because they were too small to permit efficient use of modern farm machinery, or because a higher income could be obtained in central Canada.<sup>6</sup> While various factors have caused abandonment, the fact is that the rate of abandonment, particularly in more recent years, has tended to coincide with the appearance of suitable alternative opportunities. The fact that these were much more numerous in the 1940's than previously largely explains the pronounced acceleration of farm abandonment during that particular decade.

## 2. *Trend in Number and Size of Farms*

Both the total and the improved area per farm have expanded slowly but steadily during the past several decades. Since the average acreage per farm has been increasing at the same time that the total occupied and improved acreage in farms has been decreasing, it follows that there has also been a continuous reduction in the number of farms. From 14,113 in 1911 the total number of farms has fallen to 13,701 in 1921, 12,000 in 1931, 11,400 in 1941, and 10,137 in 1951. During this 40-year period there was a reduction of 3,976 or over 28% in the number of farms, an expansion from 85 to 108 acres or 27% in the total or occupied area per farm, and an increase from 54 to 63 acres or 16.6% in the improved area per farm. It is important to note also that while the total number of

<sup>5</sup> *Economic Survey of Prince Edward Island*, J. E. Lattimer, by Department of Reconstruction, Charlottetown, 1944, pp. 40 and 41.

<sup>6</sup> See "Prince Edward Island — The Story of Its Agriculture" by W. R. Shaw, *Canadian Geographical Journal*, May, 1956, p. 186.

farms declined by 28% the smaller sized farms declined at a much faster rate than this, while the number of larger sized ones showed quite a marked increase. An appreciation of these differences may be obtained by examining the data in Table 63.

Table 63

### NUMBER OF FARMS OF DIFFERENT SIZES IN PRINCE EDWARD ISLAND

Size of farm	1911	1921	1931	1941	1951	Percentage decrease or increase
						1911-51
1-50 acres . . . . .	4,877	4,255	3,742	3,428	2,114	56.0% decrease
51-100 acres . . . . .	5,495	5,568	5,071	4,696	3,806	30.8% decrease
100-200 acres . . . . .	3,277	3,328	3,418	3,412	3,447	5.2% increase
Over 200 acres . . . . .	514	550	634	694	770	49.8% increase

As the table indicates there has been a pronounced decrease in the number of smaller farms and a marked increase in the number of larger ones. And, while these changes have been occurring throughout the 40-year period, they have been particularly marked during the 1941-51 decade. In connection with the growing number of larger farms it is significant that almost 30% of all the occupied farm land was in farms varying in size from 180 to 1,600 acres, and that over 90% of these larger farms contained between 200 and 400 acres.

### 3. *Type of Farming Trends*

During the early years of settlement the general aim was to produce something that required a minimum of capital and that could be sold immediately for cash. Major emphasis was placed on producing and exporting hay, oats, wheat, and potatoes. No special efforts were made to relate in a scientific way the kinds of production to the particular nature of the soil and climate or to select a production programme which would ensure the maintenance of soil fertility.

This cash-crop type of farming eventually led to serious depletion of soil fertility and a great deal of soil erosion. These adverse results were intensified because of the particular character of the soil, which has been formed from soft red sandstone and is not naturally deep or fertile. As it was realized that this kind of farming was causing serious yield reductions and ever more serious erosion, the growing of hay and grain for direct sale was gradually replaced by a brand of mixed farming which included several livestock enterprises. This resulted in the indirect disposition of hay and grain crops in the form of livestock and livestock products.

The actual choice of enterprises in the combination reflected the specific conditions prevailing at the time. The dairy enterprise was almost



always included for many reasons: (1) it provided at least some income at regular intervals; (2) it fitted in with the growing of hay and pasture for which the climate was particularly suited and which were specially suitable for preventing erosion; (3) it provided feed for other livestock in the form of skim milk or whey; (4) it was possible to reduce milk to the highly transportable form of butter and cheese; and (5) it was possible to get much more income when a given acreage was used for dairy rather than beef or sheep production. The beef enterprise, if included at all, was kept small because it represented a too extensive use of the limited land area, because the initial capital required for any sizable beef enterprise was more than the average farmer could afford, and because the interval between the launching of the enterprise and the receipt of income from it was too long. Hogs were usually included because the initial capital required was relatively small, because the hog turnover was fairly rapid, and because hog raising provided an effective way to market feed grain and restore soil fertility at one and the same time.

There were also several reasons for the almost universal inclusion of potatoes. Experience had shown that the soil and climate were more than ordinarily well suited to this crop. There was also the fact that potato growing had proved relatively profitable over a long period. It was also something which appealed to those who preferred purely seasonal to year-round employment and to those who liked to produce something which was apt to yield very high returns in some years even though it did little more than cover costs at other times. Most of all, a potato enterprise was included because the amount of improved acreage on the average farm was not sufficient to yield anything like a satisfactory income unless part of that acreage could be used to produce one or more commodities which would return a fairly high net income per unit of area.

As farming was more devoted to raising livestock, cropping practices tended to change with the idea of getting as much livestock feed as possible. Concretely this has meant that between 1910 and 1954 the combined acreage of wheat, oats and barley has fallen from 216,000 to 104,700 acres while the area in mixed grain has risen from 15,000 to 78,700 acres.<sup>7</sup> It has also meant that the number of acres in hay per farm has risen from 14 in 1910 to 15 in 1920, 18 in 1930 and 1940, and 19.4 in 1950. During the same 40-year period potato acreage per farm increased from 2.1 to 4.2 acres or exactly 100%. In all but a few cases, however, potato production has remained an integral part of the mixed farming programme instead of becoming a completely specialized form of agricultural activity.

While mixed farming of the above-mentioned type has continued to hold sway, two or three developments in more recent years have somewhat altered the relative significance of the specific livestock enterprises and encouraged expansion of fruit and vegetable production. The federal govern-

<sup>7</sup> Figures from Crops Section, Agricultural Division, D.B.S.

ment freight assistance programme, which has operated since October 1941, has added greatly to the possibility of making profitable use of feed grain brought from western Canada. It is estimated that close to two million bushels of western grain has been purchased each year to supplement that produced in the province itself.<sup>8</sup> This extra grain has resulted in a considerable expansion in the production of livestock and livestock products and particularly of hogs and poultry products. Hog output expanded from 79,700 head in 1941 to 115,700 head in 1951 while egg production rose from 3,242,468 dozen in 1940 to 4,586,000 dozen in 1950. While these increases were partly due to the reduced cost of imported feed grain, they were also partly the result of an improved demand situation. In addition to the markets represented by the annual contracts between Canada and the United Kingdom in respect of hog products and eggs, increased consumer income of Maritime consumers generally, establishment of military bases at different points in the Maritimes, the entry of Newfoundland into Confederation, and the rapid natural growth in the nearby population all made for a more effective demand. While these changes in demand have naturally encouraged agricultural expansion in general, they have been especially effective in stimulating production of meats and poultry products and fruits and vegetables. Between 1941 and 1951 the area in vegetables increased from 76 to 426 acres, the area in tree fruits from 184 to 303 acres, the small fruit area from 79 to 307 acres, and the area in greenhouses, mushroom and rhubarb houses from 2,825 to 14,785 square feet. For the last several years different types of factories have been processing vegetables in their off-seasons and in 1954 a full-time vegetable processing plant was established.<sup>9</sup> Moreover, since a pickle manufacturing company started operating in the province several years ago, a large acreage of cucumbers has been grown for processing into pickles. In recent years, also, the grading, packing, and quick-freezing of strawberries has been undertaken by two or three plants, with the result that strawberry growing has expanded considerably and further expansion is being planned.<sup>10</sup> Official encouragement is also currently being given to the expansion of other fruits.

In connection with livestock production, the downward trend in sheep numbers, which has been under way for several decades, has shown a definite if moderate upward movement during the last five years. In view of the fall in the sheep population from the high figure of 166,496 in 1881 to 34,386 in 1951, it is significant that the number of ewes on farms increased almost 20% between 1950 and 1955 and that total sheep numbers

<sup>8</sup> *Canadian Geographical Journal*, May, 1956, p. 185.

<sup>9</sup> *Annual Report*, Department of Agriculture, Prince Edward Island, 1954, p. 88.

<sup>10</sup> The possibility of air transport plus such technological developments as quick-freezing have combined with the increasing demand for fruit to encourage this particular type of activity.

have recently risen to 40,000 or more.<sup>11</sup> Another development has been a rather pronounced expansion in beef production. Some idea of the extent of this may be obtained by noting that the number of cows and heifers kept for beef production purposes has risen from 1.8 thousand in 1941 to 7 thousand in 1955.<sup>12</sup> While this expansion has doubtless been due to several factors including the prevalence of beef prices which were high relative to farm prices generally, it seems probable that the recent growth in the number of larger farms and in the increasing inability to secure farm labour has also been partly responsible. As farms have become larger it has become more possible to secure an adequate income from beef raising.

#### 4. *Mechanization, Specialization and Intensification Trends*

Between 1931 and 1951 the number of tractors increased from 176 to 2,776, the number of milking machines from 27 to 454, the number of electric motors from 184 to 1,754, and the number of grain combines from none to 18. The census data also show that the total value of farm machinery doubled during this 20-year period, that the amount spent on buying and repairing implements and machinery was more than five times as large in 1951 as in 1941, and that the same decade saw the amount spent on custom work more than treble. While these figures make it obvious that a considerable increase in mechanization has been occurring, it is also evident that the degree of mechanization is much less than that found in, say, Ontario or western Canada. It may be noted, for example, that the average value of machinery per farm was still only \$1,604 in 1951; that the horse population which was 29,956 in 1931 and 28,045 in 1941, had only fallen to 21,349 by 1951; that the number of tractors was still little more than a quarter as large as the number of farms in 1951; that little more than a fifth of the farms had any source of electric power; and that the same year saw only one milking machine for every 22 farms despite the major emphasis on dairy farming and the growing acuteness of the farm labour problem. Without question the degree of mechanization has been limited by the relatively small scale of operations on the large majority of the farms. The spraying of cereal crops for weed control has so far only proved possible where spraying service was available on a custom work basis.<sup>13</sup>

As already indicated Prince Edward Island's agriculture is of the generalized rather than the specialized type. While a few farmers concentrate on operating a fairly large-scale poultry or fur farming enterprise and a few others are almost full-time producers of horticultural products or honey, these are the exception to the general rule. Moreover, there is, so far, little indication of any reduction in the number of enterprises which

<sup>11</sup> Agriculture Division, D.B.S.

<sup>12</sup> Agriculture Division, D.B.S.

<sup>13</sup> *Annual Report*, Department of Agriculture, Prince Edward Island, 1954, p. 79.



are combined on the typical mixed farm. There is, however, another sense in which the agriculture of the island has developed along specialized lines. We refer to the extensive efforts which have been made to turn out products of especially high quality. This kind of specialization has assumed most widespread proportions in respect to production of seed potatoes and breeding hogs but is stressed to some degree in the production of several other products including beef and dairy cattle, roasting fowl, eggs, and turnips. This emphasis on quality has a twofold objective. Since the average farmer has not been able to produce and sell a large number of units, his only hope of securing an adequate income has lain in obtaining a higher unit price in the form of a quality premium for his limited volume of sales. In the second place quality improvement is designed to increase the value of commodities of a given weight and thereby make them more able to bear expensive long-distance transportation costs.

Thus far progress toward intensification of production methods has not been significant except in the case of potato growing. It is only in the last 15 years that use of commercial fertilizer has become at all common. And, while the annual amount used now ranges from 40,000 to 60,000 tons, the great bulk of this is devoted to potato production. Despite the growing realization of the importance of the pasture crop, little progress has been made in increasing yields by applying fertilizer. Similarly, the use of limestone has increased slowly despite payment of a substantial provincial subsidy and the fact that the desired expansion of legume production cannot take place unless generous amounts of lime are applied. There is apparently some reluctance to apply lime lest it injure the potato crop.

More insecticides and pesticides are being used, particularly in connection with the potato crop. In very recent years a start has been made at controlling weeds by means of chemicals. It is estimated that over 2,000 acres of cereal crops were sprayed in 1954.<sup>14</sup> Since there was only one acre of irrigated land in the province when the last census was taken it is obvious that irrigation has not yet become a factor. It has recently been suggested, however, that irrigation of pastures on farms catering to the fluid milk market might prove profitable and that there are many small streams which, if dammed, would provide an ample water supply.

### 5. *Productivity Trends*

According to the official index numbers the physical volume of agricultural production increased by 39.6% between 1935-39 and 1950-54. When this expansion is considered along with the fact that between 1941 and 1951 the improved land area declined 12.5% and the farm labour force 25%, it is necessary to conclude that quite substantial increases in productivity per unit of land and labour have been occurring. Extra pro-

142 <sup>14</sup> *Annual Report*, Department of Agriculture, Prince Edward Island, 1954, p. 20.



duction has resulted for the following reasons: (1) there have been increases in the per acre yield; (2) various kinds of capital goods have been combined with or substituted for labour; (3) technological improvements have helped to save crops and facilitate the tasks of breeding and feeding livestock; and (4) large quantities of feed grain were imported to supplement the amount produced in the province. Because some of the more marginal land has gone out of production, because many farms have been increased in size, because machinery and other forms of capital have been added, and because more technological knowledge has been gained and applied, it has been possible to produce a lot more product with a lot less labour. At the same time the combining of more manure and commercial fertilizer with more lime, with a better average grade of land, with better and higher yielding varieties of seed, and with improved cultural practices has resulted in significant increases in yields of some of the main crops including oats, mixed grains, and potatoes. However, only limited progress has so far been made in increasing the yield of the all-important hay and pasture crops. No significant yield trend was discernible for potatoes prior to 1940. Since then, however, a persistent upward trend has been in evidence. The normal yield is now about 250 bushels per acre compared with 170 bushels 15 years ago.<sup>15</sup>

In view of the prominent role played by the dairy enterprise it is significant that recent years have witnessed a definite, if limited, increase in milk production per cow. Such an increase is indicated by the fact that a decrease in cow numbers has tended to coincide with an expansion in total milk production. In the same way the recent expansion of the poultry enterprise has been accompanied by a really pronounced increase in the egg production per hen. Here the increase has been from 103 eggs per hen in 1944 to 190 in 1953.

## 6. *The Farm Income Situation*

Despite the generally high level of farm product prices which prevailed at the time, the gross value of products sold in 1950 was less than \$2,500 on 76.8% of the farms of Prince Edward Island. Another 12.9% of the farms sold products to a value of between \$2,500 and \$3,750 per farm, while the remaining 10.3% had a product value per farm of over \$3,750. Indeed this latter group included 169 farms which sold products varying in value from \$7,500 to \$20,000 and over per farm. On the other hand, of the large number of farms which sold products worth less than \$2,500, 2,185 sold less than \$1,200 worth, while the value of products sold by each of 1,372 more was actually less than \$250. Still another 1,321 were classified as part-time farms.

<sup>15</sup> Reference No. 117, *Report by the Tariff Board Concerning the Potato Industry in Canada*, Nov., 1955, p. 15.

In view of the small cash income which the great majority of farmers obtain from the sale of farm products, it is obvious that many of them must be classed as subsistence farmers.<sup>10</sup> For the same reason it is not surprising that almost 3,000 of the 10,137 farm operators reported that they had obtained income for work done off their farms in 1950. While 200 or 300 of them did non-farm work for one or two weeks only, fully half of the 3,000 worked off their farms for from one to six months while over a quarter of them did other than farm work for the greater part of the year.

### *III. Agriculture in Nova Scotia and New Brunswick*

#### *1. The Land Supply Trends*

In the case of both Nova Scotia and New Brunswick the amount of land in farms continued to increase until about 1911, but it declined continuously and very pronouncedly from then on. Of the 13,275,520 acres which constitute the total land area of Nova Scotia, some 5,260,455 acres or 39.6% was in occupied farms when the 1911 census was taken. By 1951, however, the occupied farm area had declined to 3,173,691 acres or 23.9% of the total land area. The decline appears even more striking if the figures showing the improved as distinct from the occupied land are considered. Between 1911 and 1951 the amount of improved farmland was reduced from 1,257,499 to 661,975 acres. Developments in New Brunswick, while differing in degree from those in Nova Scotia, followed the same general pattern. Between 1911 and 1951 the total or occupied farming area in New Brunswick declined from 4,537,999 acres or 25.8% of the provincial land area to 3,470,234 acres or 19.7%, while the amount of improved farm land declined from 1,444,567 to 1,006,377 acres. It is to be noted further that in the case of both provinces the decline in the farming area continued even during the depression of the 1930's and was particularly rapid during the 1941-51 decade.

This continuous and wholesale reduction in farm acreage has been due to a number of factors, some of which have been rather fundamental. For one thing a great deal of land was abandoned when it became necessary to shift from a purely self-sufficing to an increasingly commercial type of agriculture. So long as the self-sufficing pattern of rural economy prevailed neither the kind nor the amount of land required was of any great significance. All that was needed was an area that could be used to grow vegetables and cereals for consumption in the home and to provide pasture

<sup>10</sup> For census purposes subsistence farmers are those who sell less than 50% of the products raised on the farm. According to the 1941 census report no less than 5,705 out of 12,230 Prince Edward Island farms were classed as subsistence and combinations of subsistence farms in 1940. Although no such classification was made in the 1951 report, the number of subsistence farms would certainly be much smaller at that time than ten years earlier.

and hay for a few sheep and cattle. And since a minimum of mechanical equipment was used, the shape and size and degree of hilliness or stoniness of the fields was a matter of little consequence. Moreover, since production was for home consumption rather than for sale, the question of accessibility to markets simply did not arise. The general result was that much land that fulfilled the requirements of the early farming pattern proved entirely unsatisfactory when farming became a commercial and highly competitive undertaking. In some cases fields were too hilly or stony or too small or ill-shaped to permit efficient use of mechanical equipment and the labour in charge of such equipment. In many other instances land was deserted because it was too far from market. In still other cases it was abandoned because its low fertility made it impossible to obtain worthwhile yields except at prohibitive costs. Much of this was land which had been cleared during a period (1790-1815) when European wars were giving rise to an effective demand for ships, ship timber, and lumber. The result was that trees were cut down mainly because settlers wished to obtain cash from the sale of forest products rather than because they wished to clear the land for agricultural purposes. Having sold the timber and lumber, however, it was only natural that they should remove the stumps and use the land thus cleared for farming even though it was really only suited for forestry.

In addition to the foregoing, the farm land area has been reduced because the small size of many farms has placed them below the competitive margin and because the extractive manner in which land was used tended to eliminate its productive value. Apart from the factors just mentioned, however, there was the all-important fact that Maritime farmers found themselves increasingly unable to meet the keen competition of producers in more distant and favoured areas. Partly because they found it difficult or impossible to meet this competition and partly because they were attracted by the special land settlement provisions and the general agricultural potentialities of western Canada, large numbers of people who had been farming in the Maritimes simply deserted their farms and migrated to the Prairie Provinces. The general conclusion seemed to be that the best way to meet the new competition was to become part of it.

While a large part of the contraction in the farming area of the Maritimes was closely associated with agricultural expansion in western Canada, there can be little doubt that another and very considerable part reflected the locational disadvantages of the Maritime producers which became increasingly apparent as the general economic development of the nation proceeded. As industrial activity became more concentrated in the central provinces and as farming became more commercialized, Maritime farmer's production and living costs tended to increase because of the necessity of transporting a steadily increasing number of producer and consumer goods from Ontario and Quebec to the Atlantic region. In the same way high transportation costs greatly limited their ability to compete when offering



products in the growing urban market of central Canada. On the other hand the general industrial development of the country provided many farmers with attractive alternative job opportunities. Because of this combination of circumstances many Maritime farmers were either compelled or induced to transfer their farming activities to more favourable areas or to give up farming altogether. Both courses of action tended to reduce the Maritime farming area.

While the various factors mentioned above have contributed to the reduction in farm acreage over the longer period, the really pronounced reduction of the past 15 years has been due in large measure to the unusual opportunities for obtaining relatively remunerative non-agricultural employment. The ability to obtain this employment, and often in fairly nearby areas, has tended to coincide with the increasing inability to solve the farm labour problem and, in general, to meet the technical and financial requirements for successful farming under modern mechanized, specialized, and highly capitalized conditions. The net result of this conjuncture of events has been an abnormal increase in the number of abandoned farms.

## 2. *General Characteristics of the Land*

Apart from its actual amount there are some things about the particular nature or quality of the land which have affected and will continue to affect the general farming pattern, the degree of productive efficiency, and the total output. For one thing the soil tends to be thin, low in fertility and organic matter, and highly acid. This means that satisfactory yields cannot be obtained unless artificial fertilizer and lime are applied regularly and in large quantities and unless care is taken to maintain organic matter by using animal manure or by adopting green manuring practices. In the second place the soil tends to vary in type from place to place even within the limited area represented by the individual farm. This means that there is special need for soil testing and care in choosing the use of the land. It also makes it more than ordinarily difficult to follow a scientific rotational programme and to use each parcel of land for what it is best suited for. Another significant fact is that, in many parts of the area, the land exists in scattered pockets of innumerable shapes and sizes. The lack of compactness or continuity and the variation in shape and size make it impossible in many cases to lay out fields that are sufficiently large or regular in shape to permit modern machinery and the labour combined with it to be used with any real degree of efficiency. The situation is still more difficult where the fields are also hilly or stony. It must be remembered, however, that there are some fairly large and important sections such as the Annapolis and St. John River Valley areas in which the conditions are much more favourable than those just indicated.

It should also be noted that there are large areas where land drainage is a prime essential. In the southern and eastern end of New Brunswick,



for example, the heavy texture and poor natural drainage of the land has made provision of a drainage system a major requirement. In the important potato-growing regions of the upper St. John River Valley water erosion has been a serious problem for many years.<sup>17</sup>

Apart from the drainage requirements of areas such as these, it must be remembered that 86,250 acres of the land in Nova Scotia and New Brunswick have been reclaimed from the sea and cannot be used effectively for farm purposes until they are properly drained.<sup>18</sup> This land must first be protected against the sea by an elaborate system of dykes and aboiteaux. Provision must then be made for draining the surface water from the land into the sea. Open lateral ditches must be made at regular intervals as well as a series of main or outlet ditches to carry the water from the laterals to the sea. While the marshland is relatively fertile and is completely devoid of hills and stones, it is obvious that construction and maintenance of the dykes and ditches represents a large and continuing cost. Moreover, the network of open ditches acts as a serious barrier to the effective use of modern farm machinery.

### 3. *The Trend in Number and Size of Farms*

In both provinces there has been a continuous downward trend in the number of farms since the early years of the century. The reduction has been particularly marked in Nova Scotia. In that province the number of farms declined from 54,478 in 1901 to 23,515 in 1951, while comparative figures for New Brunswick show a drop from the high level of 37,755 in 1911 to 26,431 in 1951. In both provinces the decline became more rapid as the period proceeded.

While these reductions have been occurring, the average size of farm has been slowly but steadily increasing until 1941, since when it has declined slightly. And while part of this increase in size has been due to the combining of farms to form larger units, the main explanation is that the rate of decline in farm numbers has varied inversely with the size of farm. While farms of all sizes have become less numerous, the reduction

<sup>17</sup> See *Agricultural Institute Review*, Mar. - Apr. 1954 issue, pp. 22 and 23 for a good brief account of the drainage problem and policies in New Brunswick and Nova Scotia.

<sup>18</sup> *Marshland Utilization in Nova Scotia and New Brunswick*, by G. Haase and D. J. Packman, Economics Division, Canada Department of Agriculture, 1953, pp. 4 and 5. Also *Some Economic Aspects of Marshland Reclamation in the Maritime Provinces*, by G. Haase, Economics Division, Canada Department of Agriculture, 1954. The Marshland Reclamation Project was instituted in 1949 and represents a joint participation between the dominion and provincial governments and the individual farmers concerned. The Dominion Government is responsible for constructing and repairing the dykes and *aboiteaux* which protect the marshlands from the sea; the provincial governments are responsible for the main outlet ditches and the individual farmers are responsible for the lateral ditches.

in numbers has been most pronounced in the case of the very small farms and least marked in the case of the largest ones. Because of this the smaller farms have tended to form a steadily smaller percentage of the total number of farms while the larger ones have represented a larger percentage. Despite these changes, however, both provinces still have a very large percentage of extremely small farms. This fact becomes especially significant when it is realized that only a fraction of the acreage contained in these small farms is improved. Also worth noting is that between 1901 and 1951 the average farm size increased from 93 to 135 acres in Nova Scotia and from 120 to 131 acres in New Brunswick, though nearly 60% of the farms in both provinces are in the smaller classes. Almost half the total farmland area is represented by the relatively small percentage of farms which contain over 200 acres per farm.

#### 4. *Land Use or Type of Farming Trends*

In considering farming developments one must distinguish between the large percentage of farms in the subsistence and part-time category and the much smaller number which are operated primarily on a commercial basis. Generally speaking there has been little change in either the things produced or the production methods used by the subsistence farmers. Their usual aim has been to meet as many as possible of the family requirements in the way of potatoes and other vegetables, fruits, milk, cream, butter, poultry and eggs, and the various kinds of meat. Achieving this aim has involved using a small amount of land for growing vegetables and fruit; producing enough cereals to provide the grain ration for a few hens, a couple of pigs, a horse, and one or more cows and young cattle; and using the remaining and larger part of the total available acreage partly as pasture and partly to grow the hay needed to feed the cattle, the one or two horses, and possibly a few sheep during the winter.

The production of the part-time farmers has varied considerably. In many instances the general purpose and therefore the general nature of the farming activity is very similar to that just described. In other cases, where the farming effort has been designed to supplement the cash income obtained from other sources, the type of farming has usually been determined by the degree of market availability, the degree of intensity of demand for the various commodities, the nature of the non-farming activities, the amount and kind of land available, and the particular interests of the individuals concerned. Since the land supply is normally very limited, it has usually been necessary to select farm enterprises like small fruit and vegetable production, poultry or hog production, or fur farming, which are not really dependent on the land factor or which would result in commodities with a high value per unit of land. On the other hand it has been necessary to select types of activity which could be satisfactorily fitted in with the non-farming work programme. Where the latter has

been highly seasonal, as in the case of fishing or forestry operations, it has ordinarily been necessary to choose kinds of farming which did not require the continuous or year-round presence of the operator. This has generally meant that all the farming had to be done during the summer and often during those parts of the summer when it interfered least with fishing. Under such circumstances farming has usually been of the subsistence type already described. Where the non-farm employment has made it necessary for the part-time farmer to be away from his farm most of the day and throughout the year, farming has had to be done at the end of the day and on week-ends. Actual types attempted have included poultry keeping, fur farming, fruit and vegetable growing, bee keeping, and, sometimes, a small hog-raising enterprise.

It is the pattern of the more completely commercialized farming which has been most subject to adjustment in accordance with changes in market and general economic conditions. Until the latter part of the nineteenth century commercial farming consisted largely in production for direct sale of hay, grain, potatoes, and sheep and cattle for meat purposes. While some of these products were exported, by far the larger part went to supply the nearby local market including the substantial requirements of the lumber camps. With the growth of competition from other areas, however, and particularly that supplied by the rapid agricultural developments of western Canada, adjustments in the type of farming became necessary. From then on the trend was away from the kinds of agricultural activity just mentioned and toward a programme which represented a fair degree of regional specialization. This shift was marked by a decline in the production of grains (with the exception of oats), and sheep and beef cattle and an increasing development of a brand of mixed farming which combined several livestock or cropping enterprises in varying proportions but which placed special emphasis on producing potatoes, apples or dairy products in specific areas. While some commercialized potato growing has been carried on in several areas of both provinces, it is in Carleton and Victoria counties in the upper St. John River Valley of New Brunswick that the really specialized production has occurred. The specialized production of apples has been undertaken mainly in Kings, Annapolis, and Hants counties in the Annapolis and Cornwallis valleys and in the parish of Gagetown in the lower St. John River Valley of New Brunswick. The normal practice has been to combine some production of vegetables, livestock, and dairy products with the apple enterprise. Dairy farming, while practised to some degree in most places, has reached its greatest degree of specialization in the St. John-Sussex area in southeast New Brunswick, in the Truro area on the Nova Scotian mainland, and in the area adjacent to Sydney in the north-eastern section of Cape Breton Island. In the first two of these districts farmers have combined a limited amount of livestock production with their dairy enterprise. In the Cape Breton area, however, where dairy



farming developed in order to cater to the Sydney-Glace Bay market for fluid milk and where large-scale dependence on purchased feeds has been necessary, most income not obtained from the sale of milk has come from non-agricultural employment rather than from other farm enterprises.

In other commercialized farming districts production has been distinctly mixed. Along the St. John River between Woodstock and Fredericton, small dairy, hog, and poultry enterprises have been combined with production of potatoes, hay, and a limited amount of feed grain. In the district adjacent to Moncton and in parts of Cumberland, Hants, Halifax, Pictou, and Antigonish counties in Nova Scotia several livestock and livestock product enterprises of which dairying is normally the most important have been combined. In Madawaska county, in northwestern New Brunswick, general livestock and field crop farming has prevailed, with potatoes forming an important cash crop on most farms.

The areas already mentioned include all of those in which any significant amount of commercial farming has been carried on. Generally speaking, the remaining parts of both provinces have proved unsuitable for farming on anything like a full-time basis. This statement applies in respect of the large central and northeastern sections of New Brunswick, the south and east coastal areas of Nova Scotia and all but a minor part of Cape Breton Island. Farming in these areas has been mainly subsistence and part-time farming. Indeed it is in these areas that most of the subsistence and part-time farms already referred to have been located.

While there is still a general tendency to follow the farming pattern just indicated, recent years have witnessed some notable changes in the amount of emphasis placed upon certain specific enterprises. The 1951 census report shows that Nova Scotia's apple-producing area dropped from 37,812 acres to 21,048 acres during the 1940's. It is also stated that between 1939 and 1951 some 500 or one-fifth of the commercial apple producers went out of that business altogether.<sup>19</sup> These reductions have represented official and individual attempts to adjust to the loss of all but a minor part of the United Kingdom market on the basis of which Nova Scotia's apple industry was developed. In many cases reduction in apple production has been accompanied by expansion along other lines. Some of the largest and most highly specialized poultry farms in Canada have been developed by people who were formerly large apple producers. As a result the Annapolis Valley has become the main centre of poultry production in Nova Scotia and that province, which was a poultry deficient area until recent years, has reached the stage where exports are at least sufficient to balance imports.<sup>20</sup> Further substitutes for apple production have included

<sup>19</sup> Brief submitted to the Commission by the Nova Scotia Federation of Agriculture, Oct. 1955.

<sup>20</sup> *Commercial Poultry Production in Nova Scotia*, by G. C. Retson, Economics Division, Department of Agriculture, Ottawa, 1952. See also *The Economic Annalist*, Nov. 1948, pp. 80-82.



commercial vegetable and potato production and a small expansion of the hog enterprise.<sup>21</sup>

Recent years have also seen a marked increase in the production of vegetables, and fruits other than apples. Between 1941 and 1951 the vegetable area in Nova Scotia increased from 1,993 to 2,859 acres, the area in tree fruits other than apples from 782 to 1,201 acres, the small fruits area from 950 to 1,343 acres, and the space occupied by greenhouses and mushroom houses from 327 to 483 thousand square feet. In New Brunswick the vegetable area expanded from 988 to 1,265 acres, the area in apple orchards from 2,377 to 3,059 acres, and the area in other tree fruits from 631 to 1,231 acres. Moreover, recent Department of Agriculture reports of the two provinces indicate that still further expansion of the fruit and vegetable acreage has occurred since 1951. These increases have occurred because a larger population and higher consumer incomes have created an improved nearby market for the products concerned and because the production of fruits and vegetables appeared to be something that required little capital outlay and that might add considerably to the income of farmers with limited acreage.

Recent years have also witnessed an increased interest in producing meat animals and particularly those like beef cattle and sheep which depend mainly on pasture and forage crops generally rather than grain. This trend is indicated by increased general advocacy and definite official sponsorship of this type of farming, by concrete action on the part of organized farmers and others aiming at the establishment of co-operative slaughtering facilities, by the increased emphasis on pasture improvement and the use of grass silage, and by evidence of a shift from dairying to beef production.

Finally, the census reports suggest that the New Brunswick potato acreage, after rising steadily till the decade of the 1920's, has shown a general downward trend since that time. The reduction, however, has been extremely gradual and anything but continuous. The really significant thing, however, is that acreage reductions have not meant output reductions. Quite the contrary. Between the 1935-39 and 1950-53 periods, for example, the area in potatoes declined 1,000 acres or 2% and production increased 4,583,950 bushels or 55%. These figures make it obvious that large yield increases were occurring during the interim.

##### 5. *Mechanization, Specialization and Intensification Trends*

The amount invested (expressed in constant 1949 dollars) in power and machinery on the average farm of the two provinces increased \$628 or 70% between 1941 and 1954. This was only a third of the increase which took place in Ontario, less than a third of the all-Canadian increase, and only a fifth of that which occurred in the Prairie Provinces. Similarly

<sup>21</sup> See *Farm Organization Study of 67 Farms in Annapolis Valley*, by Gray and Gosselin, Economics Division, Department of Agriculture, Ottawa, 1948.

the decline of 31% in the horse population of the two provinces between 1940-45 and 1954 was only half as pronounced as that in Ontario or Canada as a whole. It may also be noted that the number of tractors in the two provinces increased from 713 in 1931 to 2,526 in 1941 and to 9,528 in 1951, the number of milking machines from 117 in 1931 to 3,804 in 1951, and the number of combines from 17 in 1941 to 227 in 1951. In 1951, there was still only one tractor for every 5.2 farms, one milking machine for every 13 farms and one combine for every 219 farms. In contrast Ontario farmers had one tractor for every 1.4 farms, one milking machine for every 3.8 farms and one combine for every 15 farms.

The significant conclusion to be drawn from these figures is that recent increases in farm mechanization in Nova Scotia and New Brunswick, while very considerable, have been much less pronounced than those which occurred in the country as a whole and particularly those which took place in Ontario and western Canada. It would also appear that the relatively lower average level of mechanization in the two Maritime provinces has been largely due to the fact that they contain so many small-scale non-commercial farms on which modern mechanized methods have never been either technically possible or economically feasible. If it was statistically possible to make a separate calculation in respect of the strictly commercial farms, it might well be found that the degree of mechanization on these farms is fairly comparable to that found in other parts of the country.

While special farm enterprises have tended to be associated with special areas, modern specialized techniques have not been commonly used except where farmers were able to operate on a relatively large scale and secure the bulk of their income from some one enterprise. Moreover, those farmers who have specialized in producing potatoes, apples, poultry products, and whole milk have ordinarily used far more specialized methods than those engaged in a general livestock or more mixed type of farming. The methods followed by some of the larger operators in these enterprises have been specialized to a really pronounced degree.

The remarks just made apply also in large measure to agricultural intensification. Indeed it is only in connection with the more specialized kinds of farming that any significant increases in intensification have occurred. Only limited amounts of fertilizer were used prior to the development of specialized potato and apple production and, while the constant dollar (1949) expenditure per improved acre for fertilizer rose steadily from \$1.40 in 1941 to \$2.86 in 1951, a large part of the increases went to the counties which specialize in these two crops. The three counties which comprise the main potato-producing area of New Brunswick and which accounted for over three-quarters of that province's fertilizer expenditure in 1920 still took 72% of the much larger amount used in 1954. Similarly the three counties which make up the Annapolis Valley apple-producing area accounted for 46.4% of the fertilizer used in Nova Scotia in 1920, 52.8%

in 1930 and 48% in 1954.<sup>22</sup> In Nova Scotia, in particular, recent years have seen increased use of fertilizer in connection with the pasture-improvement programme. In spite of this, total fertilizer sales in the province have declined about 27% during the past six years, owing to the general reduction in the amount of land being farmed and the reduction in apple acreage in particular.

Next to fertilizer the most important contributor to agricultural intensity is the gradual implementation of the farm drainage programme already discussed. Climatic conditions have made irrigation uneconomic except where high value crops were produced. Only 327 acres were irrigated in 1950 in the two provinces. Of the remaining factors making for intensification, more regular and thorough spraying of apple trees and potato plants is perhaps the most important. Thus far little use has been made of the chemical method of controlling weeds.

#### 6. *Productivity Trends*

In connection with labour productivity the number of improved acres per worker in Nova Scotia increased from 19 in 1931 to 21 in 1941 and 28 in 1951. In New Brunswick the corresponding increases were from 28 acres in 1931 to 29 acres in 1941 and 38 acres in 1951. These figures make it evident that the number of farm workers declined far faster than the improved land acreage. The other point to be noted is that the number of improved acres per worker was far smaller in these two provinces than in other parts of Canada or in Canada as a whole. The 28 acres per worker in Nova Scotia may be compared with 49 in Prince Edward Island, 62 in Ontario, an average of 200 in the three Prairie Provinces and 116 for Canada as a whole. The low figures in Nova Scotia and New Brunswick are due partly to the fact that much of the farming in these provinces is of the high-labour-consuming sort, partly to the fact that on many farms the labour has either not been combined with machinery at all or combined very ineffectively, and partly also to the fact that the average farm is too small to permit production factors to be organized with any real degree of efficiency. The total value of farm machinery per worker in 1951 was only \$1,074 in the case of Nova Scotia and \$1,013 in New Brunswick compared with \$2,189 in Ontario, \$2,068 in British Columbia, \$3,371 in the Prairie Provinces and an all-Canada figure of \$2,332.

In addition to the foregoing it may be mentioned that between 1935-39 and 1949-53 the New Brunswick potato yield rose almost 61%, the yield of oats, the most important grain crop, increased from 30.8 to 40.2 bushels or over 30% for Nova Scotia and New Brunswick combined, and the yield of the important hay crop increased from 1.5 to 1.7 tons or over 13%.

<sup>22</sup> See "Some Economic Aspects of the Use of Fertilizer in the Maritime Provinces", by W. V. Longley, *C.S.T.A. Review*, Jan. 1936, pp. 370-374 for earlier data and *The Fertilizer Trade 1954*, D.B.S.



Official figures also indicate that between the 1941-45 and 1949-53 periods egg production per hen rose 36% in Nova Scotia and 17% in New Brunswick. In very recent years the Nova Scotian figure has been above that of all other provinces.

### *7. The Farm Income Situation*

In view of the fact that the average farm has such a small amount of improved land and that it has been necessary in the great majority of cases to adopt types of farming which allowed this limited land area to be used in a fairly extensive rather than intensive fashion, the average income obtained by farmers in Nova Scotia and New Brunswick has been considerably smaller than that secured elsewhere in Canada. Division of the 1951 net farm income of the two provinces by the total number of farms gives a net income per farm of \$1,275, compared with \$1,722 in Prince Edward Island, \$3,723 in Ontario, \$3,803 in the three Prairie Provinces considered together, and \$3,479 in Canada as a whole. If one includes in the calculation only those farms on which the gross value of products sold was \$1,200 or over, the resulting net income figures approximate \$3,483 for Nova Scotia and New Brunswick combined, \$2,820 for Prince Edward Island, \$5,074 for Ontario, \$6,094 for the Prairie Provinces, and \$5,325 for the country as a whole. It is also worth noting that only 28% of the Nova Scotian and New Brunswick farmers sold products with a gross value of \$1,200 or over in 1951 despite the high farm product prices which prevailed in that year.

Consideration of the above figures leads to two important conclusions. The first is that the incomes received by all but a small minority of the farmers in Nova Scotia and New Brunswick are very much smaller than those obtained in other parts of the country. The second is that the total amount of farm income is far less evenly distributed among the farmers of the three Maritime provinces than among those of other sections of the country.

## *IV. Future Agricultural Prospects in the Four Atlantic Provinces*

The future agricultural production of Newfoundland is almost certain to be limited in both extent and variety. The extreme scarcity and relatively inferior quality of the land resources will make it necessary, in the future as in the past, to rely mainly on types of farming, such as vegetable and small fruit production, which tend to yield a large monetary return per acre. Even here climatic conditions are likely to limit the kinds of vegetables and fruits produced and, in the case of fruits, the areas where production can be undertaken. Unless current research and experimental work in connection with bogland reclamation makes it possible to produce winter feed in quantity and at reasonable cost, no really significant increase over present livestock numbers can be anticipated. The inability, because of lack of suitable



land, to provide the forage needed for summer and, particularly, for the long winter-season feeding, is certain to place early limits on any expansion of either meat or milk production. Commercial dairy farming has had to be confined to production for the whole milk market and present indications are that even this type of farming is more likely to contract than expand. Assuming the continuance of the federal freight assistance programme, there seems to be no technical reason why commercialized egg production should not keep on expanding. However, unless Newfoundland producers become increasingly able and willing to offer eggs at prices comparable to those charged for the product imported from Nova Scotia and Prince Edward Island, Newfoundland's egg production is likely to be restricted to the requirements of those who are prepared to pay premium prices for a strictly fresh article. Present indications are that a significant expansion of turkey and broiler production may be expected. The supply of poultry meat will also be increased to the extent that more hens will be available for killing at the end of their laying period.

In view of the special factors mentioned above and the large anticipated increase in the province's population, there seems to be every likelihood that a steadily larger percentage of most, if not all, kinds of food required by Newfoundland consumers will have to come from outside the province.

As for the future of agriculture in Prince Edward Island, recent past trends indicate that quite significant production expansion may be expected despite a probable reduction in the labour force and a possible further reduction in the land area. It is by no means certain, however, that further declines in the land area will occur. While more of the poorer land now being farmed is likely to be abandoned or transferred to forestry uses, it will not be surprising if some of the better land which has been abandoned recently because of the small size of the farm units is reorganized and farmed again on a larger unit basis. The net result may well be the maintenance of the farming area at something like its present level.

In all probability the trend toward fewer and larger farms will not only continue but become more pronounced. Further consolidation of farms will result (1) as increasing investment in expensive machinery makes it both economically necessary and technically possible to operate a larger area, (2) as continued inability to secure farm labour in sufficient amounts and on satisfactory terms forces a shift to types of farming like beef raising which require less labour but more land, and (3) as the opportunity to obtain non-farm jobs plus the desire for a higher living standard causes more of the relatively small farms to be offered for sale to those who wish to add to their acreage. Should it become less possible to rely on income from the potato enterprise, as seems highly probable, the movement toward consolidation will be further accentuated, since a considerably larger area

will be needed if income presently derived from the sale of potatoes is to be obtained from the remaining enterprises in the mixed farming programme.

Since the total amount of improved land seems likely to be limited to the present or some smaller area, the anticipated production increases will necessitate increasingly intensive farming methods. And, since labour will almost certainly continue to be scarce and expensive, considerably more mechanization may be expected. This, in turn, will tend to reduce the horse population further and permit resources previously used to produce horse feed to be used for producing meat and milk. The more intensive farming methods will include the application of more fertilizer and lime to the pasture and hay land, the increasing use of chemical weed control methods and artificial drainage systems and more thorough cultivation of the land. Various types of pasture improvement measures will be undertaken, such as more regular reseeding with better grass mixtures, clipping, grazing on a rotational basis, and lengthening the pasture season by growing crops which will provide pasture before and after the regular grazing period. In limited areas where milk is produced for the fluid market as well as in places where vegetables are produced on a specialized basis, some use of irrigation facilities may be expected.

It is unlikely that any marked changes will occur in the type of farming. Potato growing will probably tend to form a smaller part of the general farm programme. The general trend away from cereal and toward forage crop production will continue. Indeed the tendency will be to grow grain only to the extent that it is needed as a nurse crop. It is also to be expected that the present emphasis on quality in production will be maintained.

### *1. Some Differences between the Prince Edward Island Situation and that of Nova Scotia and New Brunswick.*

From all that has been said it will be evident that the natural opportunities for agricultural development are much greater in Prince Edward Island than in Nova Scotia and New Brunswick. Prince Edward Island has a far larger percentage of land suitable for farming, soil that has a higher average level of fertility and uniformity of type, topographical conditions that are much better suited to farming operations, a much larger improved acreage per farm, and a continuity and compactness of farming territory that makes for an efficiency in transportation and administration that is quite impossible in the other two provinces. Perhaps the best indication of the relatively greater agricultural potentialities of the island province is found in the fact that its 1951 improved land acreage was almost as large as that of Nova Scotia despite the vastly greater total area of the latter province. In addition to this the percentage of farm abandonment has been far smaller, the percentage of farmers in the subsistence category much smaller, and the degree of dependence on any one farm enterprise much less marked in Prince Edward Island than in the other two provinces.

Finally, there is the important fact that, whereas Prince Edward Island's production of meats and dairy products is very considerably in excess of her own requirements, Nova Scotia and New Brunswick are very much in a deficit position with respect to these commodities.

## 2. *Some Major Considerations Affecting the Future of Agriculture in Nova Scotia and New Brunswick*

As far as the future of the large amount of non-commercial or purely subsistence farming is concerned, it is likely to be determined mainly by the course of events in the non-agricultural sphere. Purely subsistence farming is something which has always been associated with an early stage of economic development, a low general standard of living, and a relative absence of regular, dependable, and remunerative types of employment or sources of income. As they have found it possible to obtain sufficient cash income from non-agricultural sources, subsistence farmers have tended to lose interest in their farming operations and to become buyers rather than producers of food. There is considerable evidence to indicate that this has recently been happening to the subsistence farmers in Nova Scotia and New Brunswick. This suggests that if these people continue to find remunerative non-farm work they may keep on owning and living on their small farm properties but they will gradually cease to operate them. They will follow this course partly because they no longer need to farm in order to get enough income and partly because the time previously spent in farming will bring more income if spent at non-farm work. In any event their action will tend to reduce the production of food and expand the market for food in the Maritime area.

As for the commercial farms, it may be said that if they continue to be organized and operated as at present they will in a great many cases fail to return adequate incomes. In that event the process of abandonment which has been going on will continue. If, however, it is found possible to reorganize these farms into fewer and larger units, it seems reasonable to expect that they will return sufficient income to warrant their continued operation. This will, of course, be particularly true where the land is really suited for farming from the standpoint of fertility, topography, and market location. There can be little doubt that many farms have been abandoned simply because they were too small to produce a sufficient volume of the kinds of products for which a market existed to yield an adequate income. Where farms are as small as many of those in the Maritimes, it is necessary either to adopt a type of farming which will give a large income per acre on the existing small farms or to reduce the number and increase the size of farms by a process of consolidation. There are limits to the adoption of the first course since only a few farms would be needed to supply all of the high-value products such as small fruits and vegetables which the market could absorb. This means that for the most part the apparent solution lies



in the direction of consolidation. In the past too many farmers have tried to secure the required amount of income by following a relatively extensive kind of farming on very small farms. If extensive types of farming must be followed, it must be on farms that are sufficiently extensive in area.

Farm consolidation of the type just indicated would mean not only fewer and larger farms but a much smaller farm population and labour force. It would also result in increased mechanization and a much higher capitalization per farm. The number of farms and farmers would be still further reduced if any part of the land now used for general mixed farming were used exclusively for a really extensive type of farming such as beef raising. It is possible that some of the better land which has been abandoned could be profitably farmed if combined into large enough units. For the most part, however, we would expect that land once abandoned will tend to remain abandoned and that food which might have been produced on such land will be obtained from areas where it can be produced more efficiently. At any rate this is what has happened to substantially similar areas in several of the New England states.

While enlarging the farm unit may bring about many changes in farming methods, more efficient production, and larger farm incomes, it may also pave the way to one or two significant changes in the kinds of farm enterprises carried on. More specifically, it may lead to an expansion of beef raising and some contraction of potato growing. A major reason why potato production has occupied such an important place in the farm programme, particularly in New Brunswick and Prince Edward Island, is that the small size of the farms made it necessary to use part of the limited farm acreage to produce something that would yield a relatively high dollar return per acre. To the extent that farms are increased in size in future this particular reason for growing potatoes will tend to lose its significance. It will become less necessary to produce potatoes simply because it will become more possible to produce something else, that is, something that could not previously be produced in sufficient volume to yield the necessary income because land was too scarce. The same lack of land which has made it necessary to grow a crop like potatoes has made it impossible to engage in an enterprise like beef raising which requires a lot of land.

Beef raising is specifically mentioned here because there is reason to believe that any future consolidation of farmland will be accompanied by a considerable expansion of this enterprise. Many people, including agricultural authorities in the area, have inclined to the view that large sections of Nova Scotia and New Brunswick are particularly suited to the growing of grass and that full advantage should be taken of this fact. This view has been based mainly on the knowledge that the area is much less subject to midsummer drought than provinces further west, with the result that better-than-average grazing conditions tend to exist at that season. In addition it is felt that much land which is too hilly or rocky to cultivate except at



excessive cost could be used effectively for grazing purposes. When these views about the production potentialities have been combined with the knowledge that the four Atlantic provinces considered as a unit are at present producing only 45% of the beef which they consume and that they have a large deficit of other meats<sup>23</sup> and butter and cheese, the case for a grassland type of farming has seemed very strong indeed. When, however, one attempts to explain why there has not been a greater development of this kind of farming in view of the apparent advantages just cited, it becomes clear that there have been several limiting factors.

While it is true that the relatively humid summer climate makes for rapid growth of grass and forage crops generally, as well as good pastures in July and August, it is also true that generous applications of lime and fertilizer are necessary if satisfactory pasture and hay yields are to be obtained. In the second place, it must be recognized that the natural pasture season tends to be relatively short; this means, of course, that the indoor feeding season tends to be relatively long. In the third place, there are very definite limits to the technical possibility of finding enough land in the same general area to make up an economic unit. The difficulty here is due partly to the fact that much land exists in scattered pockets, partly to the necessity of combining permanent grazing territory with land that is suitable for producing winter feed,<sup>24</sup> and partly to the inability to get possession of specific pieces of land. Then again, it is obvious that beef raising cannot be undertaken on the scale here envisioned without far more capital than the ordinary farmer can possibly hope to possess. This suggests that it is something which can only be seriously considered by those who are in a position to command fairly large amounts of capital and who have a definite entrepreneurial outlook. A final current obstacle to the expansion of beef raising consists in the fact that the prices obtainable for beef cattle in the Maritimes are considerably below those received for the same grade of animals in the Montreal and Toronto markets. This price discrepancy appears to be due to several factors including the absence of public stock-yards; inadequate grading and inspection of animals processed in the slaughterhouses of local butchers; lack of confidence in the quality of locally produced meat on the part of Maritime consumers; weak bargaining power resulting from the fact that there is only one packing plant in the Maritime

<sup>23</sup> A special statement prepared by the D.B.S. shows that the four provinces together had a beef deficit of almost 53,000,000 pounds in 1953 and over 61,000,000 pounds in 1954, a veal deficit of 4,195,000 pounds in 1953, and 7,412,000 pounds in 1954 and a pork deficit of 52,196,000 pounds and 48,496,000 pounds in the same two years. Moreover the Nova Scotia Deputy Minister of Agriculture states that, in his province alone, there is an annual deficiency of 150,000 hogs, 60,000 cattle, and 30,000 veal.

<sup>24</sup> It would seem that, in any general development of the type of farming under discussion here, maximum use would need to be made of the marshlands as winter-feed producing areas.

area; the fact that this plant, being relatively small, has higher overhead costs per unit than plants in Quebec and Ontario and therefore finds it necessary to offset these costs by paying lower prices for its raw material, that is, the livestock purchased; and the fact that too many of the animals offered are of relatively low grade.

While beef raising is likely to expand only to the extent that the obstacles just mentioned can be overcome, present indications are that at least some progress in this general direction may be anticipated. The increasing emphasis being placed upon pasture improvement and the use of grass silage, recent efforts to raise the standard of inspection in local slaughterhouses, the current efforts of the government and organized farmers of Nova Scotia to establish a custom killing plant at Halifax, the recent inauguration of a community pasture programme by the Nova Scotia government, and the recent increase in the number of cows and heifers kept for beef purposes all represent concrete attempts to overcome the existing obstacles to the expansion of the beef raising enterprise.

## QUEBEC

### *I. Introduction*

The purpose of this chapter is to describe and interpret recent and prospective trends in the agriculture of the Province of Quebec. There are numerous facets to such an assignment: trends in number and size of farms, number of farm people and labour force, types of farming, farm production, efficiency, incomes and expenses, farm values, demand for food, etc. A special effort is made to describe the recent and prospective patterns of agricultural production for the major regions of Quebec as well as for the province as a whole. Since farming trends in recent decades provide some indication of probable future developments, the major part of the chapter is devoted to such a study. Sections 1 and 2 of that part deal with general and regional trends in recent decades, mainly in value terms, and Section 3 examines these trends in greater detail, in physical as well as value terms. The final part of the chapter contains the outlook estimates. The implications of the trends in agriculture for the economic welfare of the farm population of Quebec are considered.

In a regional study of this kind, an economic interpretation alone could not provide an adequate understanding of the probable pattern of development during the next 25 years. Influential non-economic factors also to be taken into account are the distinctive social and cultural traditions of the province, among which family farming occupies an important place.

### *II. General, Regional and Specific Trends in Recent Decades*

#### *1. General Trends in Farming for the Province as a Whole*

Quebec, the largest province in Canada, can be divided into three dominant physiographic regions — the Laurentian Plateau, the Appalachian Uplands and the St. Lawrence Lowlands. The distinctive regional differences in the pattern and trends of agriculture inside Quebec in recent decades will be handled within such a framework. But first, certain general

farming trends for the province as a whole should be considered. Wherever relevant, the general trends in Quebec agriculture are compared with those of Canada as a whole and of Ontario in particular. Quebec (especially the main farming region of the St. Lawrence Lowlands) and Ontario have similarities of climate, soil and markets which justify a certain amount of comparative treatment in the agricultural field.

The first comparison is made between the trends in the volume of farm production. Indexes of physical farm output based on the five-year prewar period 1935-39 show that farm production in Quebec and Ontario reached record levels in 1955. Quebec farm output in 1955 exceeded that of its prewar base period by about 40%; Ontario farm output was 29% greater than in the base period.<sup>1</sup> It will be shown that the two classes of product mainly contributing to the Quebec record of farm output were livestock and dairy products. Quebec produced over the 1926-55 period an increasing proportion of the total sales value of farm products in Canada.

It would be interesting to trace the trends in output per farm worker over recent decades, but the index of farm production only reaches back to 1935. Between 1941 and 1951, however, physical farm output in Quebec increased by 28.3% and, during the same interval (according to the census) the farm labour force declined by 23.4%. These figures suggest that the physical output per farm worker in Quebec increased by 67.5% over the ten-year period 1941-51.<sup>2</sup> A similar comparison with labour force figures available from another source<sup>3</sup> for a more recent interval (average of 1946-47 to average of 1954-55) shows an impressive increase in Quebec farm output per worker of 73.1%.

The total cash farm income from the sale of farm products in Quebec in 1955 amounted to approximately 425 million dollars. In 1951 (when prices were higher) cash farm income in Quebec was 437 million dollars, or an average of \$3,253 per farm, compared with \$5,248 per farm in Ontario. Net farm income in Quebec in 1951 averaged \$2,485 per farm compared with \$3,723 for Ontario.<sup>4</sup> Here a word of caution is needed: the

<sup>1</sup> D.B.S. *Index of Farm Production 1955*.

Although a comparison of the trends in the indexes is valid, an interprovincial comparison of the size of the indexes, of course, has no significance.

<sup>2</sup> The Quebec index of physical production in 1951 was 128.3% of that in 1941, and the labour force in 1951 was 76.6% of that in 1941. The former percentage is 167.5% of the latter, i.e. physical output per worker increased by 67.5% over the period.

<sup>3</sup> D.B.S. Reference Paper No 58, *The Labour Force*, p. 72, and *The Labour Force* monthly.

The Quebec farm labour force declined over the period 1946-47 to 1954-55 by 27.7% while farm output increased by 25.1%. The labour force figures used in this case were for August.

<sup>4</sup> "Net farm income" is the return to the farmer for his labour and management of the farm, to his family for their unpaid work on the farm, and to the farmer's capital invested in the farm.



provincial averages just cited (and those yet to come) do not do justice to those efficient, progressive farmers who are well above average but whose influence in the provincial data is offset by a large number of part-time, small-scale, and subsistence producers.

Study of the trends since 1926 in the relative importance of Quebec's main types of farm products — livestock, dairy, crops, and forest and maple products, reveals that although livestock and livestock products (excluding dairy) have always been less important in Quebec than in Ontario, they are definitely becoming more important within Quebec agriculture.<sup>5</sup> In 1926, cash farm income from the sale of livestock and livestock products including poultry accounted for slightly less than one-third of all cash income from products in Quebec. The importance of livestock sales increased by 1955, with some ups and downs, to about 40% of total cash income from farm products. This increase in the relative importance of livestock in Quebec is consistent with the trend in Canadian agriculture as a whole. As Canadians prosper, they buy more meat and meat of better quality.

The second trend revealed in the cash farm income data is the increased importance of dairying within Quebec agriculture. In 1926 the cash income from the sale of dairy products was about 30% of the total income from the sales of all farm products, compared with nearly 38% in 1955.<sup>6</sup> This increase in the importance of dairying was more prominent within Quebec than in Canadian agriculture as a whole. This is partly due to a favourable climate in Quebec for producing forage for dairy cows, partly due to dairying being a labour-intensive type of farming which is well suited to the relatively dense farm population, and partly due to a policy of encouragement and protection.

The third concurrent trend revealed is a declining relative importance within Quebec agriculture of crops as a source of cash income. In 1926, income from the sale of crops accounted for about 26% of all income from the sale of farm products, compared with less than 9% in 1955. Again, this trend coincided with a similar trend in Canadian agriculture as a whole, while in Ontario there has been a slight tendency in the opposite direction. The broad implication of the general trend is that increasingly farm crops are being marketed indirectly in the form of livestock.

The cash income received by farmers from the sale of forest and maple products maintained a fairly stable relationship to total cash farm income in Ontario over the 1926-55 period but showed a gentle upward trend in

<sup>5</sup> D.B.S. 1926-48 - *Handbook of Agricultural Statistics, Part II, Farm Income*.  
1940-49 - *Revised Dairy Statistics*.

1949-55 - *Farm Cash Income, Annual, and Dairy Statistics, Annual*.

<sup>6</sup> The relative importance of dairying is greater than these figures suggest because the cash income from the sale of the livestock by-products of dairying is included in the income from livestock.

Quebec and Canada as a whole. Forest and maple products are much more important in Quebec farming, however, than in Ontario and Canada as a whole. The cash income from forest and maple products in recent years amounted to nearly 13% of total cash farm income in Quebec, compared to just over 2% in Ontario and about 3.5% for the whole of Canada.

The constituent details of the four major trends just described in the composition of farm output in Quebec in recent decades will be studied in the third section of part II of the chapter. The major trends are now related to the concurrent general developments in agricultural production. Here there are three broad categories of factors of production to be considered — people in the forms of farm operators and workers, fixed capital in the forms of land and buildings, and movable capital in the forms of machinery and livestock.

The farm population of Quebec has declined since 1941, but in contrast with Ontario and Canada as a whole, the 1951 Quebec farm population of 792,756 still exceeded its 1931 size of 777,017.<sup>7</sup> The size of the farm population, relative to the total population of Quebec, definitely shows a downward trend, however, as industrialization gathers momentum. This is also the case in Ontario and Canada as a whole. In 1931 the farm population of Quebec constituted 27% of the total population of the province, but by 1951 it had declined to 19.5% of the total population, compared with 15.3% for Ontario and 20.8% for the whole of Canada.

From the viewpoint of the trends in farm production, the farm labour force is more relevant than the farm population. A definite downward trend can be seen in the size of the Quebec farm labour force, especially since 1941. The farm labour force in 1951 was 195,410, compared to 255,083 in 1941 and 217,706 in 1921. This over-all trend conforms with the trends in farm labour force in Ontario and Canada as a whole. The trend in size of the farm labour force, expressed as a proportion of the total labour force, is declining still more rapidly. In 1951 the farm labour force amounted to only 13.3% of the total labour force of the province, compared with 27.9% in 1921. In June, 1955 the farm labour force amounted to 11.9% of the total labour force. Further evidence of the declining relative importance of agriculture in the Quebec economy is provided by comparing the net value of agricultural production to the net value of total production — the annual average over the period 1938-42 was 12.4% compared with 9.5% for the period 1950-54.<sup>8</sup>

The census reveals a decline over the 1921-51 period in the area of farmland in Quebec and Ontario, in marked contrast to Canada as a whole. The area in farms in Quebec in 1951 amounted to 16.8 million acres, compared to 18.1 million in 1941 and 17.3 million in 1921. The rapid decline in the number of farms which accompanied this trend in Ontario does not

<sup>7</sup> *Census of Canada, 1951.*

<sup>8</sup> Quebec Bureau of Statistics, *Quebec Statistical Yearbooks* and *Quebec 1954.*

hold true for Quebec, however. The number of farms in Quebec in 1951 was 134,336, compared to 144,900 in 1941 (using the 1951 census definition of a farm) and 137,619 in 1921. The large number of farms in 1941 reflected the depression conditions of the 1930's. The degree of owner-operation in Quebec farming is conspicuous — 94.3% in 1951, compared with 81.7% for Ontario, and 77.2% for Canada as a whole.

Because the number of farms has not declined faster than the farming area, there has not been a resulting increase in the average size of farms as there has been in Ontario and in Canada as a whole. The average size of farm in Quebec in 1921, 1941 and 1951 was 125 acres. This is partly because Quebec agriculture in general had not yet felt the full impact of farm mechanization, partly because the province subsidizes the settling of new areas in farms of less than average size, and partly because the consolidation of existing farms would mean fewer farmers with attendant dislocations in the rural community.

Apparently, there has only been a negligible increase since 1921 in the percentage of total farmland improved, in contrast with Ontario and Canada. Many Quebec farms, particularly in the St. Lawrence Lowlands, have long since passed the land-clearing stage of their development. The proportion of total farm land under cultivated crops has declined slightly in Quebec (34.8% to 34.5%) and Ontario, and increased slightly in Canada, since 1921. The declining acreage in crops in Quebec and Ontario reflects, in part, the increasing importance of pasture within the expanding livestock and dairy sectors, and, more especially, the large purchase since 1941 of feed grains from the prairies under the federal government freight assistance programme. Although the proportion of total farmland in pasture increased noticeably between the 1941 and 1951 censuses, it is to be noted also that the 1951 percentage is still lower than the 1921 figure. In Ontario farming, however, there has been a definite long-run increase in the relative amount of pasture land.

The census values of farms, of farmland and buildings, of farm implements and machinery, and of livestock show that although there has been a long-run increase in average value per farm in current dollars, farm values dropped during the 1931-41 period. This fall in farm values in the 1931-41 period was mainly in terms of a decline in the value of land and buildings, but also in the value of implements and machinery and livestock. The constant dollar value (1949 dollars) of Quebec farms increased from \$7,785 per farm in 1935 to \$8,703 in 1954.

When attention is paid to the relative value of these capital factors of production, a clear pattern emerges. Over the 20-year period 1931-51, there was a definite decline in the relative value of land and buildings and



pronounced increases in the relative values of machinery and livestock.<sup>9</sup> This structural shift in farm assets toward machinery and livestock and away from land and buildings has two important implications. Because the machinery and livestock are movable, the farmer himself is more mobile and his investment is more liquid. Because the machinery and livestock are of shorter life than real estate, farmers are in increasing need of intermediate and short-term, relative to mortgage, credit.

In none of the census years 1921-51 were average values per farm (in total or for land and buildings, implements and machinery, and livestock) as high in Quebec as in Ontario or Canada as a whole; nor did average farm values increase as fast in Quebec as in Ontario and Canada as a whole in recent decades. The higher average value of farms in Ontario is explained, in part, by the presence of certain rich farming areas in that province in which the very fertile soil and highly suitable climate permit high yields per acre and per worker and high income per farm. The terrain, moreover, was often conducive to mechanization. Also, the average size of farm in Ontario, which in 1921 at 114 acres was smaller than in Quebec, increased to 139 acres in 1951 compared to a constant 125 acres in Quebec. Finally, a larger proportion of Quebec farms are part-time or subsistence farms (33.8% in 1951, compared with 20.4% in Ontario).<sup>10</sup>

The foregoing provides in summary a sort of decennial stock-taking of farm people, land, and invested capital. It is necessary now to trace the trends in costs of the main farm inputs that were used to produce the cash income from the sale of farm products already mentioned.

The two inputs which now loom so large among Quebec farming costs — feed and seed, and farm machinery — have doubled in relative importance since 1926. In 1926, feed and seed costs constituted about 16% of the total operating costs including depreciation, compared with 35.5% in 1955.<sup>11</sup> This is a more important position than feed and seed costs hold within Ontario farming or Canadian agriculture as a whole, even though the trends there also have been upward. This trend in Quebec is a reflection of the expansion in livestock and dairy farming and of the shift toward the purchase of feed grain from the West.

In 1926 machinery operating costs<sup>12</sup> in Quebec farming amounted to about 7% of total operating and depreciation costs, compared with 13.3%

<sup>9</sup> The value of land and buildings in relation to total farm value in Quebec declined from 73.3% in 1921 to 60.5% in 1951. The value of machinery increased from 10.3% of total farm value in 1921 to 15.1% in 1951, and the value of livestock from 11.4% to 24.3%. The constant dollar value of land and buildings (real estate) per farm also declined between 1935 and 1955.

<sup>10</sup> It may also be that, in Ontario, farmland values are inflated more by site value owing to the impact of rapid and decentralized industrial and residential expansion.

<sup>11</sup> D.B.S., *Handbook of Agricultural Statistics*, Part II, *Farm Income*, and *Farm Net Income*, Annual.

<sup>12</sup> Includes running costs of tractor, truck, car, engine and combine, and machinery repairs.



in 1955. In spite of this increase in importance of machinery operating costs, these costs are still not as important as within Ontario (17.6%) or Canada as a whole (22.2%). Farm mechanization is not yet far advanced in Quebec.

Building repairs are another item that has been increasing in importance in recent years relative to total costs in farming. In 1955 building repairs constituted 8.6% of total operating and depreciation costs in Quebec farming, compared to 5.6% in 1926.

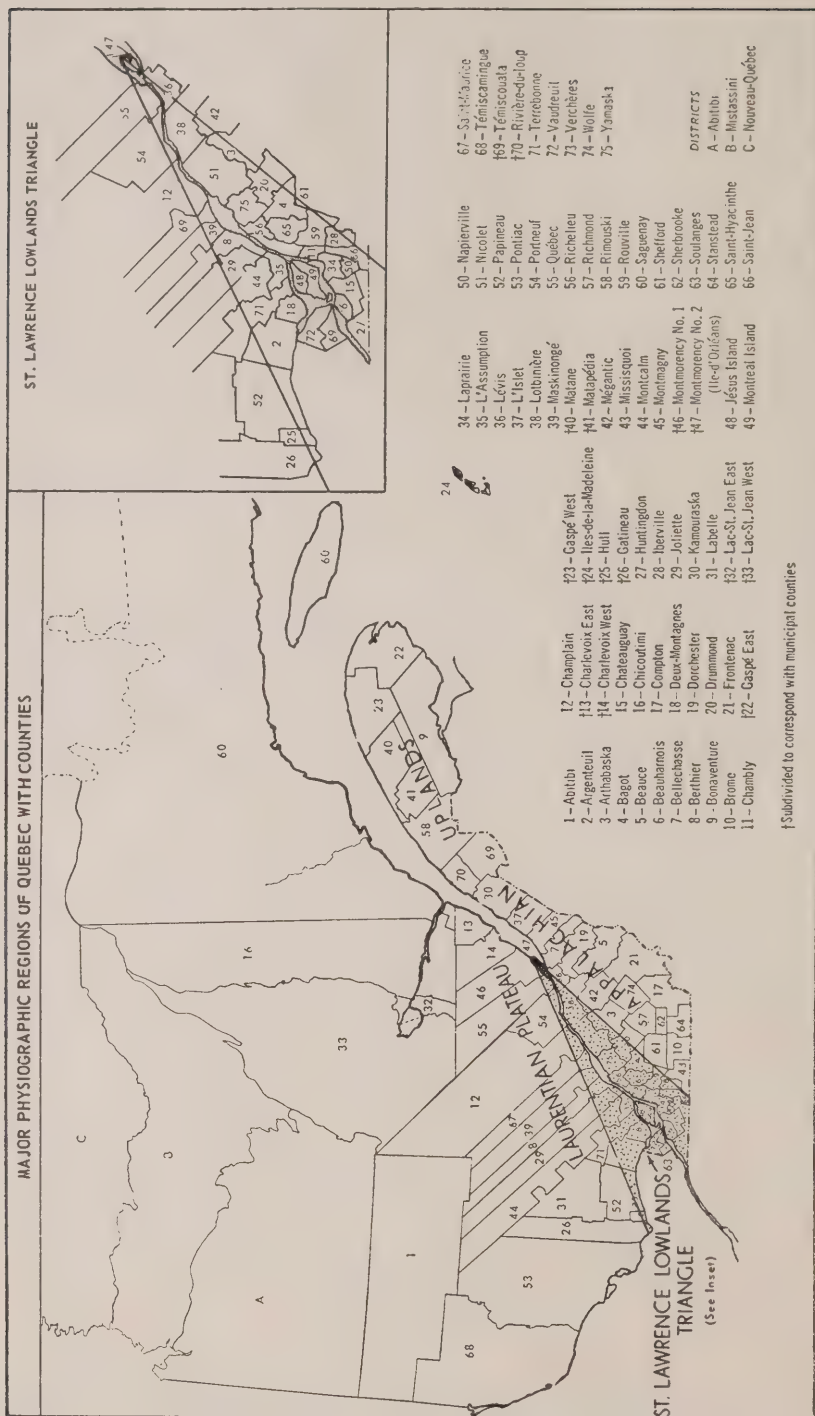
The relative importance of depreciation allowances on buildings and machinery has been declining faster in Quebec farming than in Ontario and Canada as a whole owing to slower farm mechanization. Labour costs in Quebec farming relative to total operating and depreciation costs have declined since 1926 but not as fast as in Ontario. Labour has not been displaced as fast in Quebec by labour-saving machines. The relative importance of taxes on farmland and buildings has declined more in Quebec than in Ontario and Canada as a whole.

Other less important items of farming expense are fertilizer, fruit and vegetable supplies, interest on debt, rent and other miscellaneous items. Fertilizer costs in 1926 accounted for only 1% of total farm operating and depreciation costs in Quebec, increasing gradually thereafter to 3.5% in 1955. Although the relative importance of fertilizer costs is lower in Quebec farming than in Ontario, it is on a par with that of Canadian agriculture as a whole. The use of chemical fertilizers is not yet well under way.

## 2. *The Regional Profile of Quebec Agriculture*

Nearly 17 million acres, or about 5% of all land in Quebec, is occupied for farming. This farming land needs to be classified geographically within some meaningful framework. For this purpose the province can be divided into three dominant physiographic regions — the Appalachian Highlands or Uplands, the Laurentian Plateau, and the St. Lawrence Lowlands (Map). Farming in the rough and hilly Appalachian region is carried on more in the lower Eastern Townships area where the terrain is less extreme than in the upper peninsula area. Farming in the Laurentian region, which is part of the vast rock formation known as the Precambrian of Canadian Shield, tends to be restricted to the southerly river valleys with the exception of the clay belt areas of Abitibi and Lake St. Jean. In the Laurentian region the climate is cool and the summer is short but the summer days are long. The efforts of the government to establish settlers on new land ("colonizing") have been most prominent in this region.

Farming in Quebec has developed mainly in the St. Lawrence Lowlands, where there are moderately fertile soils and a suitable climate and where the waterways and concentrations of population provide ready markets. The St. Lawrence Lowlands region includes the valleys of the St.



Lawrence River and its tributaries. This agricultural area can best be pictured as a large, irregular triangle with the base line set artificially by those sections of the provincial and international boundaries running from Hull across to the mouth of Lake Champlain. The left side of the agricultural triangle set by the Laurentians extends from Hull, and the right side set by the Appalachians extends from Lake Champlain. The apex of the triangle is at Orleans Island.

The wide variations in conditions, not only between physiographic regions but also within some of the counties, make a thoroughgoing analysis of the regional trends in Quebec agriculture highly desirable. At the same time, this is difficult without some further breakdown of counties into smaller statistical units.<sup>10</sup> In 1953 Quebec adopted a system of grouping counties according to ten economic regions.<sup>11</sup> This system of economic regions does not provide the refinement required here because it retains county boundaries intact, whereas several boundaries overlap two physiographic regions.

Some refinement of statistical county data by physiographic regions can be achieved either by regrouping those parishes (statistical subdivisions) belonging to overlapping counties on the basis of physiographic regions, or by a sampling process which takes into account only those counties that lie wholly within each of the three physiographic regions. Certain agricultural information (farm population, tenure, area and condition of farmland, farm values and size, inventories of livestock and areas of field crops) is available for the parish subdivisions of Quebec counties from the census of Canada. But, since this farming information is limited compared to what is available for the counties, the time and space available do not warrant a laborious reclassification of parishes in the overlapping counties according to physiographic regions. The other alternative of sampling counties by physiographic regions is followed here. Ten sample counties were selected from each of the St. Lawrence and Appalachian regions. The St. Lawrence sample counties are Yamaska, Richelieu, St. Hyacinthe, Vercheres, Chambly, Laprairie, Beauharnois, Chateauguay, Soulanges, and Vaudreuil. The Appalachian sample counties are Dorchester, Beauce, Megantic, Frontenac, Wolfe, Richmond, Compton, Sherbrooke, Stanstead, and Brome. Only two counties, Labelle and Saguenay, could be classified as falling within the Laurentian region. It seemed advisable, therefore, to enlarge this sample

<sup>10</sup> There are 68 counties (7 of which are subdivided) and 3 districts.

<sup>11</sup> The ten regions are (1) Gaspé-South Bank, (2) Saguenay-Lake St. Jean, (3) Quebec, (4) Three Rivers, (5) Eastern Townships, (6) Montreal, (7) Metropolitan Montreal, (8) Ottawa, (9) Abitibi-Temiscamingue, (10) North Shore-New Quebec. For a thorough study of zoning and an explanation of Quebec's zoning procedure, see Canada Department of Defence Production, *Economic Zoning of Canada* and the *D.D.P. Geographic Code* (Ottawa, August 1953) and *Economic-Administrative Zoning of Canada*, (Ottawa, June 1954) Part 1, pp. 11-14, 19, 20, 69, 92 and Part IV, pp. 13-32.

by including three other counties (Papineau, Charlevoix and Temiscamingue) in which farming is carried on mainly within the Laurentian region. Also there are special cases like Isle Jésus and Gaspé counties that require separate treatment.

It should be emphasized that much valuable work remains to be done along the line of regional refinement of statistical data. That this is especially necessary for Quebec has been pointed out repeatedly. Only a beginning is made here.

Paralleling the sequence of treatment in Section 1 as closely as the available data allow brings us to the changes between 1940 and 1950 in the relative importance of the four main sources of cash farm income — livestock, dairy, crops, and forest and maple products — for the sample counties of the St. Lawrence, Appalachian, and Laurentian regions. The absolute sizes of these data are probably not too significant, but their relative magnitudes, on the average, can be interpreted as being representative of general differences among the three regions.

A comparison of the cash farm income with the number of farms reveals that in 1950 the average cash income per farm for the sample counties of the St. Lawrence region (\$2,729) exceeded the average cash income per farm for the sample counties of the Appalachian region (\$2,002) by about 36%. The average cash income per farm in 1950 for the sample counties of the Appalachian region, in turn, exceeded the average cash income per farm for the sample counties of the Laurentian region (\$1,270) by about 58%. Comparable data for 1940 suggest that the lead in cash farm income of the St. Lawrence counties over Appalachian narrowed, and the lead of the Appalachian counties over the Laurentian widened, between 1940 and 1950.

If the census data are interpreted with care,<sup>15</sup> some further inter-regional comparisons of farm income in Quebec can be made. From the census were taken estimates of expenditures of the farms of the sample counties in 1940 and 1950, and estimates of the value of products consumed on the farm. The 1941 census also showed income earned from outside sources by members of the family not permanently working off the farm.

Whereas the 1950 cash income per farm of the St. Lawrence sample counties was about 36% greater than that of the Appalachian sample counties, the cash expenditures per farm of the St. Lawrence sample counties exceeded those of the Appalachian by about 47%. The average value of products consumed on the farms was nearly the same for the counties of both regions, and the income earned from outside sources in 1940 was

<sup>15</sup> The farm expenditures by counties in the census include purchases, rather than depreciation, of machinery and purchases of building materials, rather than depreciation of buildings.



greater for the Appalachian counties. The result (cash farm receipts minus expenditures, plus income in kind, plus estimated income from outside sources) was about the same in 1950 for the counties of both regions.<sup>16</sup>

When the data for the Laurentian sample counties are examined, the result is similar. Although cash income per farm in the Appalachian counties exceeded that in the Laurentian counties by about 58% in 1950, the cash expenditures per farm in the Appalachian counties were 45.3% larger than those for the Laurentian counties. The estimated value of the products consumed on the farms of the Laurentian counties, however, slightly exceeded that on the farms of the Appalachian counties, and the value of income from outside sources (such as mining and off-farm work in the woods) was considerably larger in the Laurentian counties. The net result was an income to farmers in the Laurentian sample counties similar to that for the St. Lawrence and Appalachian sample counties.

Summing up the foregoing from the point of view of the welfare of the farm family, we can say, tentatively, that although cash farm income is substantially higher in the St. Lawrence counties than in the Appalachian, and in the Appalachian counties than in the Laurentian, there is a tendency for this to be compensated by greater income from outside the farm and (to a much smaller extent) greater home consumption of farm products in the Appalachian and Laurentian regions than in the St. Lawrence Lowlands.<sup>17</sup>

This compensation for lower cash farm income in the Laurentian region is only made possible because the farmer spends a good deal of his time working off the farm. In 1950 about 37% of the farmers of the Laurentian sample counties reported work off their farms, compared to 32% and 18% for the Appalachian and St. Lawrence sample counties, respectively. Furthermore, of those farm operators reporting work off the farm in 1950, the proportion working off the farm more than 49 days was highest for the Laurentian counties (84.5% compared to 70.8% for the Appalachian and 73.3% for the St. Lawrence counties). Since there are many efficient farms with incomes well above these averages, there must also be several pockets, particularly within the Laurentian region and the peninsula area of the Appalachian region, where the level of living is lagging far enough behind to be a cause of concern. In 1950, the number of part-time and subsistence farms in the sample counties of the St. Lawrence region amounted to 16.4% of the total compared to 26.7% and 44.6% for the sample counties of the Appalachian and Laurentian regions respectively. These

<sup>16</sup> It was assumed that the income from outside sources in 1950 bore a relationship to cash farm income plus value of products consumed on the farm similar to that in 1940.

<sup>17</sup> The greater value of home-consumed products (fuel, as well as food) on the farms of the Laurentian and Appalachian counties could simply be a reflection of the larger size of the farm family in those regions.

remarks must be qualified to the extent of income earned by any members of the family permanently working off the farm. There is an urgent need here for up-to-date, detailed, regional information on farm incomes, some of which might be provided by farm and household management studies.

There are also some important differences among the regions in the relative economic importance of livestock, dairying, crops, and forest and maple products. In 1950, livestock sales were the most important source of cash income in all three regions, but especially in the Appalachian region. Cash income from dairy products, on the other hand, although the second most important source of cash income in all three regions, was about of equal importance to the farms of the St. Lawrence and Appalachian regions but of considerably less importance to the farms of the Laurentian region. In 1940, however, for the St. Lawrence and Appalachian regions, dairying was a more important source of cash income than livestock. The third most important source of cash farm income in 1950 varied among the three regions — in the St. Lawrence region it was crops, but in the Appalachian and Laurentian regions it was forest and maple products. Forest and maple products were relatively unimportant to farming in the St. Lawrence region, and cash crops were not very important to farming in the Appalachian region. Sales of forest products were most important to farming in the Laurentian region. Between 1940 and 1950, however, the relative importance of forest and maple products and of crops, as sources of cash income to the farms of the Laurentian region declined, while the importance of livestock increased.

In 1950, the cash income from livestock and livestock products (excluding dairy) received by the farmers of the St. Lawrence sample counties averaged \$1,101 per farm, compared with \$937 for the Appalachian sample counties and \$553 for the Laurentian sample counties. There are sometimes considerable differences among the counties of a region in the relative importance of the various sources of cash income from livestock. Nevertheless, certain generalizations can be made. Cattle sales were the most important source of income from livestock in all three regions in 1950, but especially in the Appalachian Uplands. Swine were the second most important source of income from livestock in the three regions in 1950, followed by poultry and eggs, and horses, sheep and wool. There is evidence that swine have become the most important source of income from livestock since 1950. Comparing the three regions, poultry and eggs are most important in the St. Lawrence Lowlands, and horses, sheep and wool in the Appalachian and Laurentian regions. Honey is of some importance as a source of cash income in the St. Lawrence region, and fur in the Appalachian region.

In 1950, the cash income from dairying received by the farmers of the St. Lawrence sample counties averaged \$1,039 per farm, compared with \$705 for the Appalachian sample counties and \$405 for the Lauren-

tian sample counties. Fluid milk and cream and butterfat are the chief sources of income from dairying, followed by milk for cheese and concentrated milk products. Data are not available, however, to permit a detailed regional breakdown of cash farm income from the sale of milk for its various purposes. Fluid milk sales are, of course, most important in the St. Lawrence Lowlands because of proximity to the larger markets (Montreal, Quebec, Three Rivers, etc.) and because of suitable soil and climate. The Montreal market reaches out for its fluid milk as far as the fringes of the St. Lawrence region on both sides of the river, and into Ontario on the west. The milk produced in the Appalachian and Laurentian regions is mainly for butter, cheese, and concentrated milk products.

In 1950, the income from the sale of crops received by farmers of the St. Lawrence sample counties averaged \$580 per farm, compared with \$82 for the Appalachian sample counties and \$122 for the Laurentian sample counties. Again, there were considerable differences among the counties of a region in the relative importance of the various sources of cash income from crops. Nevertheless, income received from the sale of grains was the most important source of crop income in the St. Lawrence counties as a whole followed by hay and forage, vegetables, potatoes and roots, and fruits. Income received from the sale of hay and forage was the most important source of crop income in the Appalachian counties, followed by grains, potatoes and roots, fruits and vegetables. Hay and forage was also the most important source of cash income from crops in the Laurentian region followed, in this case, by potatoes and roots, grains, vegetables and fruit.

The cash income from forest and maple products received by the farmers of the St. Lawrence sample counties in 1950 averaged only \$54 per farm compared to \$275 and \$190 for the Appalachian and Laurentian regions, respectively. The income from forest products was more important than that from maple products in all three regions, but maple products were least important in the Laurentian counties (2.8% of total cash income from forest and maple products) more important in the Appalachian counties (35.3%) and most important in the St. Lawrence counties (41.0%).

There was a substantial decline in the farm population of the St. Lawrence sample counties, comparing 1951 with 1931, and a smaller relative decline in the Appalachian sample counties. The farm population increased in the Laurentian sample counties between 1931 and 1951, however. An examination of the changes between 1941 and 1951 in the farm population of all the counties of Quebec supports the generalization that the farm population in the St. Lawrence and Appalachian regions has been declining, while that in the Laurentian region has been increasing.

There was a decline in the number of farms between 1931 and 1951 in the sample counties of the Appalachian and St. Lawrence regions and



an increase in the Laurentian region. The number of people per farm in 1951 was 5.2 in the St. Lawrence counties, 5.7 in the Appalachian counties and 6.1 in the Laurentian counties. These figures represented a slight decrease in the St. Lawrence counties, a slight increase in the Laurentian counties, and an increase in the Appalachian counties, compared with 1931. In the Appalachian region, the ownership of many farms has changed from English to French with an accompanying increase in family size.

Comparisons of average farm areas and trends in farm size expose clear-cut regional disparities. In 1951, the size of farms in the sample counties of the St. Lawrence region averaged 104 acres compared with 143 acres for the sample counties of the Appalachian region and 156 acres for the sample counties of the Laurentian region. The size of farms in the St. Lawrence counties increased only slightly between 1931 and 1951, whereas the size of farms in the Laurentian counties declined over this 20-year period. Thousands of colonists were settled in the Laurentian region on farm lots of less than average size. The size of farms in the Appalachian counties increased by 8-9%, however, between 1931 and 1951.

As might be expected, the St. Lawrence sample counties have the highest percentage of farmland improved (82.2% in 1951), but this was no greater than in 1931. The Appalachian sample counties showed a definite increase in the proportion of improved farmland, from 45.7% on the average in 1931 to 52.7% in 1951. The sample counties of the Laurentian region also showed an increase in the proportion of farmland improved.

The proportion of total farmland under crops is much greater in the St. Lawrence region (62.5% in the sample counties in 1951) than in the Appalachian and Laurentian regions (29.5% and 22.9%, respectively, for the sample counties). There was a slight decline in 1951 compared with 1931 in the proportion of farmland under crops in the St. Lawrence and Appalachian counties, but no appreciable change in the Laurentian counties.

The Appalachian sample counties had the highest proportion of farmland in pasture in 1951 (21.5%), but the St. Lawrence sample counties were first in this respect in 1931. The importance of pasture within the farming of all three regions increased between 1931 and 1951, but the increase in its importance in the Appalachian region was conspicuous.

As one would expect, the average value per farm in the St. Lawrence region (\$14,359 in 1951) has exceeded that in the Appalachian (\$11,288), and the average value in the Appalachian has exceeded that in the Laurentian (\$8,935). The value of land and buildings, as a percentage of total farm value, is greatest for the St. Lawrence sample counties (62.5% in 1951, compared with 55.5% and 60.4% for the Appalachian and Laurentian regions, respectively). The relative decline in value of land and build-



ings between 1931 and 1951 was pronounced in all three regions. The value of livestock, as a percentage of total farm value, is greatest for the Appalachian region (30.3% in 1951 compared with 23.0% and 21.9% for the Laurentian and St. Lawrence regions, respectively). The relative value of livestock at least doubled, on the average, between 1931 and 1951 in the sample counties of all three regions. The value of implements and machinery, expressed as a percentage of total farm value, corresponds closely among the three regions (16.6% for the Laurentian counties in 1951, compared with 15.6% and 14.1% for the St. Lawrence and Appalachian counties, respectively). In all three regions there was a considerable increase between 1931 and 1951 in the value of implements and machinery relative to total farm value.

Finally, special mention must be made in this section of two exceptional cases, the counties of Isle Jésus and greater Gaspé. Isle Jésus is located in the St. Lawrence Lowlands, but so near to Montreal that its agriculture does not conform to the St. Lawrence pattern described above. The average cash farm income on Isle Jésus is considerably higher (about 11% higher in 1950) than that of the St. Lawrence sample counties, reflecting the fact that the Jesus Island farms produce intensively for metropolitan Montreal, especially such items as vegetables, and poultry and eggs, but also potatoes and roots, dairy products, and swine.

The census figures show that farm expenditures on Isle Jésus in 1950 averaged about \$200 less than those on the farms of the St. Lawrence sample counties. Although labour costs were higher on Isle Jésus, feed costs were much lower. The values of home-consumed produce and of income from outside the farm were smaller on the Isle Jésus farms.<sup>18</sup> On balance, it looks as if the disposable income of the farm family was considerably higher on Isle Jésus than in the St. Lawrence sample counties.

The relative importance of crops as a source of cash income to the farms of Isle Jésus declined only slightly between 1940 and 1950 (from 59.7% to 58.4% of total cash farm income). As was the case with the St. Lawrence sample counties, the relative importance of livestock increased on Jesus Island farms between 1940 and 1950 and the relative importance of dairy products decreased.

The Jesus Island farms are much smaller than those of the St. Lawrence sample counties, the former averaging 57 acres in 1951 compared to 104 acres for the latter. In 1931, however, Isle Jésus farms averaged 72 acres in size. The proportions of total land on Isle Jésus farms that are improved and in crops are greater than that for the St. Lawrence counties, but the proportion in pasture is lower. The proportion of improved

<sup>18</sup> Again, no information is available on income earned by members of the family permanently working off the farm.

land on Isle Jésus farms increased from 80.0% in 1931 to 84.5% in 1951, and the proportion in crops increased from 62.1% to 63.0%. The average value of farms on Jesus Island is higher than for the St. Lawrence counties, and the proportions of total value in land and buildings, and implements and machinery are higher, but the relative value of livestock is much lower.

Gaspe county lies within the Appalachian region but it does not conform to the pattern set by the Appalachian sample counties which was described above. This is mainly because the Gaspe farmers are really farmer-fishermen who derive a large part of their total cash income from off the farm.<sup>10</sup> It is to be noted that the economic features of the other counties in the peninsula area of the Appalachian region more closely resemble the pattern already outlined for the Appalachian counties than the pattern of Gaspe county.

The most important sources of cash farm income in Gaspe county are forest products, cattle, hay and forage, and dairying. The relative importance of forest products as a source of cash farm income increased between 1931 and 1951, in contrast with the sample counties of all three major regions. The Gaspe county farms are much smaller than those of the Appalachian counties, the former averaging 52 acres in 1951 compared to 143 acres for the latter. The size of farms decreased in Gaspe county and the number of farms increased between 1931 and 1951, in contrast with the trend for the Appalachian counties. The number of people per farm is larger in Gaspe county than in the Appalachian counties (6.2 people per farm in 1951 compared with 5.7). The proportion of total land on Gaspe county farms that is improved and in crops and pasture is smaller than for the Appalachian counties, and the average value of farms in Gaspe county is less than half. The proportion of total farm value represented by land and buildings is higher for the Gaspe county farms than for the Appalachian counties, but the proportion represented by machinery is lower, and of livestock considerably lower, than for the Appalachian counties.

The average cash income from farming in Gaspe county is less than one-third (perhaps one-quarter) of that of the other counties in the Appalachian region. In 1950, the average cash farm income in Gaspe county was about \$329, with about half of this derived from the sale of forest products. This suggests that Gaspe county is being farmed sub-marginally. If the \$329 of gross cash farm income in 1950 held a relationship to total gross cash income from all sources similar to that reported for 1940, this would mean a gross cash income per farm family in 1950 of \$1,019. The census estimate of the average value of products consumed on the Gaspe county farms in 1950 was \$425. This makes a total of gross cash income

<sup>10</sup> About 67.7% in 1940, *Census of Canada, 1941*, Table 30.

earned and farm income in kind per farm family in 1950 of \$1,444. To get net income earned per family, the expenses incurred in farming and in the off-farm operations have to be deducted from this total. The cash outlay in farming in 1950 was estimated at \$214 per farm. This makes a total of net farming income, farm income in kind, and cash income from outside the farm, of \$1,230 per farm family or about \$198 per person. The amount of the non-farm expenses is uncertain, and, allowing for a wide margin of error in the figures already presented, the deduction of these expenses would seem to be unnecessary in order to demonstrate not only that the farming in Gaspé county is sub-marginal, but also that the combined farming-fishing operation does not provide enough income to maintain the family at a socially acceptable standard of living. Family allowances and other possible income transfers such as old-age pensions, as well as any income earned by members of the family permanently working off the farm, would have to be added to the above figures in order to obtain a complete picture of the welfare of the farm families of Gaspé county, but this would not substantially alter the general conclusion drawn.

### 3. *Some Specific Trends in Quebec Agriculture in Recent Decades*

This section deals in more detail with the general trends, already described in Sections 1 and 2, in the production and marketing of livestock and livestock products, dairy products, crops and forest and maple products. An examination is made of developments in productivity in these different lines and of certain specific policies bearing upon trends in agricultural production and marketing. The constituents of only the more important trends are surveyed in this section, and their treatment, of course, is not intended to be exhaustive. Technology was treated in a general way in Chapter 4.

#### (a) *Livestock*

Livestock and livestock products (including poultry but excluding dairy) have been shown to be both the most important source of cash income in Quebec agriculture and of increasing importance as time passes. In 1955 the sale of livestock and livestock products accounted for about 40% of total cash farm income. The dollar value of these products in 1955 was \$173,417,000, which was surpassed only in the years 1950-52. Quebec has been producing an increasing proportion of the total value of livestock produced in Canada over the 1926-55 period.

Livestock sales are the most important source of farm income in all three physiographic regions of Quebec. Between 1940 and 1950, livestock sales displaced dairy products as the most important source of cash farm income. This shift in emphasis in type of farming was most marked in the Appalachian region, but the Laurentian region also showed a shift from dairying toward livestock. However, if the income obtained from the



meat by-products of dairying is credited to the dairy enterprise, dairying would still rank as the most important type of farming in the St. Lawrence region.

The most important kind of livestock on Quebec farms is hogs. Generally speaking, hog raising is handled by the farmer as an enterprise which is supplementary to dairying. Although the relative importance of hogs within the livestock picture varies, there is clear evidence of a rising trend over recent decades. In the 1926-30 period, hogs accounted for about 31% of the cash farm income from livestock, compared with 41% in 1951-55. The annual output of hogs over the 1941-45 period averaged 1,237,000 compared with 1,630,200 over the 1951-55 period. The available data do not indicate an increase since 1940 in productivity in hog raising; this is measured by the number of hogs marketed per farrowing, by the ratio of hog output to hog population on farms, by the number of pigs weaned per sow, and by the relation of hog output to pigs weaned. Unfortunately, data are not available on the output of pork in relation to feed and labour inputs. The percentage of grade A hogs marketed has been declining slightly.

Poultry and eggs recently have been the second most important source of cash income from livestock, accounting for about 30% in 1954-55. The value of poultry meat exceeds that of eggs, but a flock of laying hens is still a familiar feature on Quebec farms. The numbers of hens and chickens reported on farms by the census increased from 7,861,959 in 1931 to 10,090,003 in 1951, and the number of turkeys increased from 150,246 in 1931 to 423,104 in 1951. Production tends to be concentrated around the larger cities. Egg production increased from 27,834,169 dozen in 1930 to 46,922,000 dozen in 1950. The annual output of eggs per laying hen has been rising rapidly. The quality of poultry and eggs also has been rising. By agreement, the egg grading stations are federally inspected. Montreal and Quebec City have grading regulations for poultry meat. There is no evidence of a long-run trend (although there have been swings up and down) in the relative importance of poultry and eggs as a source of cash income from livestock.

Cattle and calves are the next most important source of cash income from livestock, accounting for 27.3% in 1954-55. Cattle and calves have improved their relative position within the livestock picture in recent decades. The number of cows and heifers (two years old and over) kept for beef purposes on Quebec farms on June 1, 1955, was 30,000 compared with 11,000 in 1944.<sup>20</sup> In addition, steers and heifers of less than two years kept for beef purposes have to be taken into account. Although the proportions of total Quebec steers and heifers for beef grading "choice" and "good" have been increasing and the proportion grading "medium" has

<sup>20</sup> These two years appeared to be at comparable phases of the cattle cycle.



been decreasing, the percentage grading "common" has also been increasing.<sup>21</sup> There has been a definite improvement in the quality of veal calves, however.

Cash income from the sale of other livestock and livestock products (sheep, lambs, furs, etc.) as a percentage of cash income from all livestock has definitely declined in recent decades, from about 11.5% in 1926-27 to 2.7% in 1952-55. There has been a conspicuous long-run downward trend in sheep numbers in Quebec, as in the rest of Canada. There have often been more profitable uses to which the land could be put, the sheep farmers have suffered heavy losses from dogs and wild animals, and the cost of replacing the old rail fences by woven wire fences has been high. The number of ewes on Quebec farms decreased from an annual average of 295,400 during the years 1941-45 to 166,200 during the years 1951-55. Within the years 1951-54, however, there was a reversal of this trend, but it may be temporary. Quebec marketings of sheep and lambs in 1955 declined relative to 1954. In recent years there has been a downward trend in the proportion of sheep and lambs grading "good". There has been a conspicuous increase in the proportion of Quebec sheep and lambs sold on a rail basis, but the percentage of carcasses grading "A" has declined in the last three years.

#### (b) *Dairying*

Dairying is very important in Quebec farming and Quebec is the leading dairy province of Canada. The trends and problems in the dairy industry are best understood against a national setting.

The dairy industry comprises the producing, processing, and marketing of fluid milk and milk products. The most important milk products, apart from fluid milk, are butter, concentrated milk (evaporated and condensed milk, and milk powders), cheddar cheese, and ice cream. The milk used on farms (in the farmhouse and for livestock feed) also has to be taken into account. Butter and fluid milk together utilize more than three-quarters of all the milk produced in Canada. In 1955, butter accounted for 45.6% of all milk produced in Canada (that is, 45.6% of 17,277 million pounds) and fluid milk 30.9%, compared with 5.3% for concentrated products, 5.0% for cheddar cheese, 3.2% for ice cream, and 9.5% used on farms. The consumption of dairy products in Canada in 1954 (in pounds per capita of milk equivalent) was: butter 481.7, fluid sales 334.4, farm consumed 70.8, cheddar cheese 51.4 and other cheeses 9.4, concentrated milk 46.4, ice cream 32.0. The total was 1,028.4 pounds of milk per capita. The cash income received by Canadian farmers from all milk sales in 1955 amounted to \$438 million and the value of milk kept on farms was estimated at \$62 million.

<sup>21</sup> Canada Department of Agriculture, *Livestock Market Review*, 1955, p. 66.

Fluid milk and the various milk products are produced widely across Canada, but especially in Quebec and Ontario, which, between them, account for over two-thirds (Quebec 35.1% in 1955 and Ontario 32.0%) of total milk production. In other words, dairying in Canada is widely but unevenly dispersed among the provinces. Quebec has been producing an increasing proportion of the total value of dairy products produced in Canada over the 1926-55 period. Dairying was well suited to Quebec conditions. The main factor on the market (demand) side of the industry affecting the location of dairying was the density of population. The main factors on the supply side affecting the location of dairying were adequate rainfall to enable the economical production of grasses for cattle feed, and (in the case of fluid milk) the perishability of the product. Dairying could be run as a labour-intensive enterprise on Quebec farms where labour was plentiful. Moreover, the competition of margarine sales has been prohibited, although an increasing amount of uncoloured spreads of animal fat origin is being sold. The marketing of dairy products is regulated by the Quebec Dairy Industry Commission.

The extreme climatic differences between the winter and summer seasons in Canada have established a seasonal cycle in milk production tied to the availability of cheap cattle feed. The peak period of the seasonal milk production cycle is from May to September, and the low period centres around the month of February. A large proportion of the butter, cheese and concentrated milk products are made during the summer months. In spite of this seasonal pattern, dairying (especially fluid milk production) is a relatively stable source of farm income.

Dairying has been the staple of Quebec agriculture and it still is in the St. Lawrence Lowlands region, which is the main agricultural region of the province. In 1926 the cash income from the sale of dairy products in Quebec was about 30% of the total income from the sale of all products. By 1955 the importance of dairying had increased to the point where cash income from dairy products accounted for 37.7% of all cash farm income, compared with 19.5% in Ontario. The value of Quebec dairy products sold in 1955 was \$160,426,000. In 1951, 81% of all Quebec farms reported having dairy cows and 67% reported receiving cash income from dairying. There was an average of 8.2 cows per farm with milk cows. The number of cows and heifers (two years old and over) kept for milk purposes on farms at June 1, 1955, was 1,121,000, compared with 1,018,400 in 1944. In 1948, an artificial insemination centre was established at St. Hyacinthe, and the demand for its services, through the media of local artificial insemination clubs, has been expanding.

Fluid milk sales are the most important source of income from dairying in Quebec, especially in the St. Lawrence Lowlands. Over the period 1951-55, fluid sales accounted for 50.2% of the total cash income from dairying, compared with 46.3% over the period 1940-44. The pro-

portion of total milk production used for fluid sales increased from 30% around 1940 to nearly 35% in 1950 and then receded to 33% in 1955. An increasing relative importance of fluid milk sales implies increasing seasonal stability for the dairy industry. The four biggest fluid milk markets are Montreal (27% of the total for the province), Quebec and Levis (5%), Sherbrooke (1%) and Three Rivers (1%). The Dairy Industry Commission sets the price of fluid milk both to the producer and the consumer.

Butterfat is the most important use of milk in volume terms.<sup>22</sup> As a source of income from dairying, it is of secondary importance in Quebec as a whole, and of primary importance in the Appalachian and St. Lawrence regions. The relative importance of butterfat sales, as of fluid milk sales, has increased in recent years. Over the period 1951-55, sales of butterfat accounted for 40.8% of the total cash income from dairying, compared with 36.0% over the period 1940-44.<sup>23</sup> Some of these sales were made under the price support programme to federal warehouses where there was a build-up of stocks.

The next most important (and an increasingly important) source of income from dairying in Quebec is the sale of milk for manufacturing, other than butter. Over the period 1951-55, sales of milk for manufacturing accounted for 5.7% of the total cash income from dairying, compared with 3.4% over the period 1940-44.<sup>24</sup> The sale of concentrated milk products, especially concentrated skim milk products, has been rising rapidly. The sale of milk for cheese in contrast with fluid milk, butterfat, and milk for manufacturing, has been declining in relative importance in Quebec in recent years. Over the period 1951-55, sales of milk for cheese accounted for only 3.0% of the total cash income from dairying, compared with 12.7% over the period 1940-44.

In spite of the importance of dairying in Quebec, it is difficult to find data on the average milk production per cow milked. That the productivity per milk cow is increasing is certain, however, when annual total milk production is divided by the number of cows and heifers kept for milk. In 1941 this milk output averaged 4,316 pounds, compared to 5,406 pounds in 1955. This is an increase in milk yield per animal of 1,094 pounds in 14 years, or nearly 80 pounds per year. The longer run increase in milk output per cow appears to have been at the average rate of 71.5 pounds per annum.

The number of dairy establishments in Quebec (675 in 1954) has been declining mainly because of consolidation and abandonment of small cheese factories. The number of concentrated milk plants (12 in 1954) has been increasing, however.

<sup>22</sup> About 48.2% of total milk production in 1955 compared with 42.4% in 1950.

<sup>23</sup> Includes butterfat for ice cream as well as creamery butter.

<sup>24</sup> Includes ice cream as well as concentrated milk.

*(c) Crops*

It was pointed out in Section 1 that crops have been declining in relative importance as a source of cash income to Quebec farmers. In 1926, income from the sale of crops accounted for about 26% of all income from the sale of farm products. By 1955, cash income from crops amounted to \$36,770,000, which was less than 9% of cash income from all farm products.

The analysis in Section 2 suggests that crops were the third most important source of cash farm income in the St. Lawrence Lowlands region, coming after livestock and dairying. In the Appalachian and Laurentian regions, however, cash income from crops appeared to be smaller than from forest and maple products as well as from livestock and dairying.

Cash sales values do not tell the whole story of crop production. This is partly because crops may be consumed to some extent on the farm, and partly because the sales values of various crops may not reflect their relative acreages accurately. Yields, too, are important for projection purposes. It has been pointed out already that expenditures on fertilizer have been increasing relative to total farm operating costs, but that the use of fertilizer on crops in Quebec, as in the other provinces of Canada, has scarcely begun.

The proportion of total farmland improved has increased slightly in Quebec since 1921, but the proportion of total farmland under crops has declined slightly, being displaced by pasture. The total farm area declined from 17,257,012 acres in 1921 to 16,786,405 acres in 1951, and the area under crops declined from 5,964,154 acres in 1921 to 5,685,516 acres in 1951.

The proportions of total farmland improved and under crops are largest in the St. Lawrence region. The proportion of farmland in crops declined slightly in the St. Lawrence Lowlands and Appalachian regions in recent decades, but there may have been a slight increase in the Laurentian region.

Although the proportion of farmland in pasture on Quebec farms increased between 1941 and 1951, the 1951 proportion was still lower than that of 1921. The increase in importance of pasture apparently took place in all three regions. The Appalachian region showed the highest proportion of farmland in pasture in 1951, whereas the St. Lawrence region was first in this respect in 1931.

The relative importance of fruit and vegetables within the cash crop picture has been increasing conspicuously in Quebec in recent decades. In 1955, income from the sale of fruit and vegetables (\$16,306,000) amounted to 44.3% of all cash income from crops, contrasted with 13.8% in 1926. Quebec has been producing an increasing proportion of the total value of



fruits and vegetables produced in Canada over the 1926-55 period. The Quebec season is late, however, and imports from Ontario and elsewhere are large.

Vegetables are more important than fruit as a source of cash income, but the relative importance of fruit is increasing. Over the last 15 years, the production of tomatoes, beans, celery, beets, peas, lettuce, corn, cauliflower, and asparagus appears to have been on the increase. The production of carrots, spinach, cabbage, and onions appears to be declining. The data show that the yields per acre of beans, beets, cauliflower, celery, corn, peas, and tomatoes have been increasing, but that the yields of cabbage, lettuce, and spinach have been decreasing. The yields of carrots and onions have shown an unchanging trend. The production of apples, strawberries, and blueberries has been expanding since the 1930's, but raspberry production has been declining. Apples are the most important source of cash income from fruits, accounting for \$3,957,000 in 1954, or one-fifth of total cash income from fruits and vegetables. Quebec has about 30% of all the apple trees in Canada. Over half of Quebec's apple trees are of the McIntosh variety.<sup>25</sup> The scarcity of data makes it impossible to say anything definite about trends in area and yields of fruit.

The relative importance of potatoes as a cash crop has declined in recent decades. In 1955, income from the sale of potatoes amounted to 15.4% of all cash income from crops, compared with 26.5% in 1926. The area in potatoes declined from 2.4% of total crop area in 1921 to 1.6% in 1951. Since 1951, however, the potato acreage has remained fairly steady (except for 1953) at around 92,000 acres. Potato yields over the ten-year period 1946-55 were 143 bushels per acre, compared to a higher yield (146.5 bushels per acre) for the long-run period 1908-55.

The importance of tobacco has varied over the years, but there is a trend upward. In 1955, tobacco sales accounted for 9.7% of all cash income from crops, compared with 6.8% in 1926. The area in flue-cured and cigar tobacco has maintained in recent decades a stable relationship to the total crop area of .2%. The area in flue-cured and cigar tobacco in 1951 was 3,458 acres, and this increased to 10,190 acres in 1954 and 11,008 in 1955. The yield of flue-cured tobacco has been rising, and over the 1954-55 period it averaged 915 pounds per acre. The normal yield of cigar tobacco is about 1,100 pounds per acre. The special advantage of the flue-cured tobacco crop is that it provides an economic use for otherwise infertile and unproductive sandy soil. In recent years there has been a rapid increase in the use of portable irrigation.

The sale of sugar beets, which began only in recent years, has reached a value which in 1955 amounted to 2.6% of total cash crop income. The

<sup>25</sup> D.W. Ware, "Recent Trends in the Production and Distribution of Canadian Apples", *The Economic Annalist*, Canada Department of Agriculture, Vol. XXIV, No. 5, Ottawa, 1954.

government set up a sugar refinery at St. Hilaire to promote this culture. The coming of the sugar beet crop meant that the area in all field roots has maintained a fairly stable relationship at around .4% to total crop area. The sugar beet acreage has been declining in recent years, however, from 9,738 acres in 1951 to 5,800 acres in 1955. The average yield of sugar beets over the 1944-55 period was 9.4 tons per acre. The acreage of other field roots has also declined (from 11,500 acres in 1951 to 10,800 acres in 1955) and the yield has declined from 8.45 tons over the 1908-55 period to 7.95 tons over the 1946-55 period.

The sale of feed grains has been declining in importance as a source of cash income. In 1955, the value of oats sales amounted to 4.4% of all cash income from crops, compared to 15.8% in 1926. Barley sales in 1955 amounted to only .1% of total cash crop income compared with 6.3% in 1926. Wheat sales, which amounted to 2.3% of total cash crop income in 1926, declined to an insignificant amount some years ago. The area in oats, in relation to total crop area, decreased from 27.3% in 1921 to 25.9% in 1951. The oats area declined further between 1951 and 1955 from 1,396,000 acres to 1,316,000 acres. The yield of oats over the period 1946-55 averaged 27.1 bushels per acre compared with 26.6 bushels for the long-term average. The area in barley as a percentage of total crop area declined from 1.8% in 1921 to 1.1% in 1951. The area in barley then dropped from 61,600 acres in 1951 to 51,400 acres in 1955. The yield of barley over the 1946-55 period averaged 24.6 bushels per acre, compared to 23.8 bushels for the long-term average. The wheat acreage declined in relative importance from 1921 to 1951 and from 12,200 acres in 1951 to 10,800 acres in 1955. The yield of wheat over the 1946-55 period averaged 19.2 bushels per acre, compared with 17.5 bushels for the long-term average. In contrast with the declining importance of oats, barley and wheat, the relative importance of the area in mixed grains increased from 1.6% of total crop area in 1921 to 3.7% in 1951. Since 1951, however, the area in mixed grains declined from 212,000 acres to 199,000 acres in 1955. The yield of mixed grains over the 1946-55 period was 28.8 bushels per acre, compared to the long-term average of 27.1 bushels per acre.

The decline in importance of feed grains, in terms both of area and cash farm sales, is a reflection of the increasing importance of pasture within the dominant livestock and dairy sectors, but more especially of the importation of large amounts of feed grain from the West under the feed grain freight assistance policy of the federal government. Between October 1941 and September 1956, \$100,441,063 of freight assistance was paid by the federal government on 15,422,570 tons of western feed grains shipped to Quebec. This assistance amounted to \$6.51 per ton of feed grain (barley, oats, wheat, mill-feeds, etc.).

About 23% of cash crop income in Quebec in 1955 has not been identified above. This would include forage crops, buckwheat, seed, corn, rye, peas, beans, etc. There are also negligible acreages of other fodder and field crops such as corn for husking, flax, etc. The area in tame hay, in relation to total crop area, increased from 61.2% in 1921 to 64.1% in 1951. The hay area in 1951 was 3,654,000 acres, and this rose in 1955 to 3,725,000 acres. Hay yielded 1.46 tons per acre over the 1946-55 period, compared to 1.42 tons for the long-term average. In Quebec, as in the other provinces, the number of farmers who fertilize their hay crops and pasture must still be few indeed. In addition to hay there was also a relatively small acreage of grain for hay.

*(d) Forest and maple products*

The cash income received by Quebec farmers from the sale of forest and maple products, expressed as a percentage of total cash farm income, increased slightly over the 1926-55 period. In 1955 it amounted to \$54,373,000 or 12.8% of total cash farm income, compared to 11.4% in 1926.

Forest and maple products are now a more important source of cash income to Quebec farmers than crops. In 1951, 61% of all farm operators reported cutting forest products (fuelwood, pulpwood, logs for lumber, fence posts, etc.) for use and sale of an average value of \$344 per farm reporting. In 1951, 16% of all farms reported producing maple products for use and sale, of an average value of \$317 per farm reporting. The relative importance of maple products as a source of cash income from forest and maple products has declined over the 1926-55 period (from about 25% in 1926 to 18% in 1955).

The data in Section 2 suggest that the cash income per farm in 1950 derived from forest and maple products was about the same in the Laurentian and Appalachian regions, but much smaller in the St. Lawrence region. The income from forest products was more important than from maple products in all three regions in 1950, but especially in the Laurentian region.

The forest was an obstruction to early settlers, but the farm forest should now be regarded like the soil as a producer of periodic crops. Since this crop is best harvested in the slack winter season, it provides an excellent supplementary use of farm labour. It should be remembered that the sale of maple syrup does not in itself imply a depletion of the capital represented by the maple bush, whereas the sale of forest products is too often a sale of capital. On the other hand, the sale of forest products may sometimes be a legitimate by-product of the clearing of more farmland for cultivation. Perhaps even some distress cutting by farmers in times of low prices for their farm products can be condoned. There is a danger, however, especially in the Laurentian and Appalachian regions, of some sub-marginal farmers who can never earn enough income just from farming, depleting their



forest capital continually, to their ultimate ruin and the detriment of the public.

(e) *Mechanization*

It was shown in Section 1 that there was an increase over the 1921-51 period in the relative importance of machinery among the assets of Quebec farmers. The value of implements and machinery expressed as a percentage of total farm value increased from 10.3% in 1921 to 15.1% in 1951. The investment in machinery was well above average for the farms of the St. Lawrence sample counties but below average for the farms of the Appalachian and Laurentian sample counties. This change is a symptom of the mechanization that has begun to take place on Quebec farms. Although mechanization is under way, the investment per farm in machinery is considerably lower than in Ontario (\$1,578 in Quebec in 1951, compared to \$2,970 in Ontario). The value of sales of new farm machinery in Ontario in 1951 was almost 2½ times that in Quebec, although Ontario had only 11% more farms. In 1955 the value of sales of farm machinery in Ontario was twice that in Quebec.

There is a positive correlation between size of farm and cash farm income on the one hand and the size of the investment in farm machinery on the other hand. Quebec farms, unlike Ontario farms, did not increase in average size over the 30-year period 1921-51, and many Quebec farms do not have a scale of operation large enough to make much mechanization worthwhile. Small farms can benefit from mechanization by becoming bigger in order to increase the use of machinery or by doing custom work. Sometimes small farmers can exchange machinery or buy it on shares.<sup>26</sup> Mechanization may be warranted where timeliness of operation is crucial. Mechanization has a strong propensity to replace some farm labour and, in the process, increase the output per worker of the labour which remains. The emphasis in Quebec has not been on raising productivity per farm person, in this sense.

An excellent illustration of the relation between scale of operation and the economies of mechanization is the introduction of mechanical milking. Although Quebec produced nearly as much milk as Ontario in 1951, Ontario had more than twice as many milking machines. Larger economies in mechanical milking depend largely on having a herd of milk cows above the typical number on Quebec farms. Only 7.9% of all Quebec farms reporting dairy cows in 1951 had 18 or more cows per farm, compared with 9.7% in Ontario. Since 16.1% of the dairy farms reported having milking machines in Quebec in 1951, it can be inferred that there were some farms with milking machines that had too few cows to ensure an economical utilization of the machines.

<sup>26</sup> See Dawson & Fortier, *Farm Mechanization in Ontario and Québec*, Canada Department of Agriculture, Ottawa, Nov. 1954.



Although farm mechanization in Quebec has lagged behind that in Ontario, the tempo of mechanization in Quebec since 1941 has been rapid along certain key lines. The increases in numbers of tractors, trucks, cars, combines, milking machines and electric motors on Quebec farms over the 1921-51 period were prominent. Tractors provide the best index of mechanization in its first major phase not only because of the change over from horse power to tractor power, which releases a lot of farmland for other productive purposes, but because the adoption of tractor power usually leads to converting to various and more expensive tractor-drawn implements. The number of tractors increased from 968 in 1921 to 5,869 in 1941 and then jumped to 31,971 in 1951.

The number of horses decreased from 1921 to 1931, increased with the increase in farms from 1931 to 1941, but then dropped sharply between 1941 and 1951. There were 1.7 horses per farm in Quebec in 1951, compared with 2.2 in 1931 and 1941. In 1951, the sample counties of the St. Lawrence region had a slightly higher ratio of horses per farm than the Appalachian sample counties, and the latter had a higher ratio than the Laurentian sample counties.

There was a great increase in the number of combines. The number of threshing machines, on the other hand, declined after 1931. The number of gasoline engines declined after 1941, but the number of electric motors increased conspicuously. In 1951, 67% of the farms reported having electric power. The number of motor trucks on Quebec farms nearly tripled between 1941 and 1951 and the number of automobiles increased by 54%, in spite of a drop of over 10,000 in the number of farms.

#### *(f) Policies affecting farming trends*

In its broadest sense, official farm policy in Quebec has aimed at preserving a strong rural community built distinctively upon the three pillars of family, language, and Church. The main features of this policy in recent times have been the provision of credit for maintaining and establishing farmers on existing farms and settling new areas, of supporting co-operative credit, marketing and processing, of encouraging various labour-intensive types of farming (such as dairying, fur farming, sugar beet production and tobacco growing), of promoting rural electrification and drainage, and supporting agricultural education and extension. Only a brief examination of some of these government programmes is made here, from the point of view of their bearing upon economic trends in farming and in the marketing of farm products. This is not meant to imply that these programmes were enacted primarily for economic purposes. Treating only enacted policies is an oversimplification, however, because it neglects the various sections of opinion among which differences exist as to how important a place economic considerations should have in farm policy.

The Quebec Farm Credit Bureau began its operations in 1937. Its loan capital has been successively increased until, at July 1, 1955, it had at its disposal from the provincial treasury \$130 million. The Bureau makes mortgage loans (39½ years, at 2½%) to established farmers or settlers buying farms of amounts up to 75% of the value of the farm, the loans not to exceed \$7,000. Of the 43,680 loans made in 1954 amounting to \$114,447,570, 42% of the loans and 48% of the money lent was for the establishment of the sons of farmers on farms of their own. The Quebec Farm Credit Act of 1936 which set up the Farm Credit Bureau, also provides for loans to co-operatives in certain outlying regions. Quebec's farm credit programme has provided generous support for the policy of preserving a vital farm community in the traditional pattern. From the viewpoint of obtaining farm income and efficiency, however, the question arises as to whether the maximum loan is adequate to finance a farming unit with enough good land, modern machinery, and high-grade livestock. An alternative approach would involve reorganizing and consolidating existing farms more often than transferring ownership of existing farms or making a net addition to the number of farms.

In 1897, colonization in Quebec became the concern of a separate government department. It had previously been administered jointly with the Department of Agriculture. Between 1897 and 1934 the Department of Colonization was headed by a Minister holding another portfolio, but since 1934 there has been a separate Minister of Colonization. In 1950 the Department began a Settlers Guidance Service with the responsibility of interesting suitable families in settling on new land. Also in 1950 the Order of Pioneering Merit was created to encourage competition among settlers and to recognize outstanding services rendered in the cause of colonization.

The *Montreal Gazette* of January 28, 1956, reported Colonization Minister Begin as saying that his Department had settled 6,540 lots of 100 acres each in various colonies since 1948, that is, an average of 818 lots per year. During 1955, 995 settlers were established. Mr. Begin said that settlers for opening new land were hard to find. The Department's budget for 1956-57 was \$13,690,000.

Meanwhile, in spite of vigorous efforts, the total number of farms in Quebec is declining. It can be said, however, that if it were not for the colonizing programme, the number of farms would be declining even more rapidly.

The new land colonized is often on the northern fringe of existing settlement. This implies, in most cases, that extensive rather than intensive farming would be more appropriate economically, whereas the size of the settlement lots is below rather than above, the average for the farms of the province.<sup>27</sup> Colonizing costs rise as alternative employment opportunities

<sup>27</sup> A settler is permitted, however, to obtain up to three lots, that is, up to 300 acres of land.

become more attractive and as the standards of living required by existing and prospective settlers rise. The latter involves expensive municipal services as well as household amenities.

The influence of co-operatives in the rural community of Quebec is pervasive. The support of co-operation has long been a leading feature of provincial policy, partly for the economic benefits accruing to the members, and partly because the philosophy and practice of co-operation blend fairly well with the over-all objective of farm policy. The property of co-operatives is tax exempt.<sup>28</sup> Co-operative buying, selling and processing is popular with the farmer.

The number of co-operative societies and members of co-operatives has been declining some since 1950. In 1954, there were 771 co-operative associations in Quebec, 29.8% of the total for Canada. Of the Quebec co-operatives, 648 were marketing and purchasing associations with a membership of 87,029. The volume of sales transacted by these 648 co-operatives was \$128,445,275, slightly over half of which was sales of farm products.

There are also two wholesale co-operatives — the large *Coopérative Fédérée de Québec* and the *Alliance des Coopératives de Consommation*. The provincial union of co-operatives is the *Conseil de la Coopération de Québec*.

The Agricultural Marketing Act, which the legislative assembly passed in February, 1956, setting up a central farm products marketing board, resembles the Ontario Farm Products Marketing Act of 1946 but contains elaborate safeguards for co-operatives. The Act declares itself to be supplementary to formal co-operation.

A particular product marketing plan, set up under the Act, must specify its price-negotiating and selling agencies, either or both of which may be existing co-operatives. The Quebec Agricultural Marketing Board has been invested with supervising, regulating, and investigating powers in order to promote the marketing of farm products "in a manner as advantageous as possible to the producers, but with due regard for the legitimate interests of the consumers". The setting up of joint marketing plans under the new marketing board can be expected to be gradual and cautious.

A rural electrification bureau was established in 1945 to zone the province and to assist rural electricity co-operatives by loans and free specialist services. Since 1945, the proportion of farms with electric current has increased from 20% to over 80%. The Quebec Yearbook says: "Rural electrification can be an important factor of social stability by the impetus it can give to the development or revival of handicrafts and home industries in rural districts".<sup>29</sup> The Quebec Department of Agriculture has a rural

<sup>28</sup> The government also assists credit unions.

<sup>29</sup> *Quebec Statistical Yearbook 1954*, p. 297. See also pp. 432-34.



engineering branch which helps to reclaim and improve farmland. The liming of farmland is assisted. The province has also an experimental fur farm.

There are regional and county extension workers or agronomes. The government provides financial aid to agricultural societies and clubs, and the agronomes give them guidance. There is an Order of Agricultural Merit to encourage better farming. The provincial government liberally supports agricultural education at schools and colleges. In 1947, the Quebec Agricultural Research Council was set up, and it has actively encouraged scientific research, education and publication.

### *III. Prospective Trends in Quebec Agriculture*

The outlook estimates contained in this final part of the chapter are based on trends in Quebec agriculture in recent decades (which were examined in some detail in the second part of the chapter and need not be repeated here) and on estimates of Canada's food requirements during the next 25 years. The population estimates of the Commission staff were adopted for this purpose as well as the estimates of per capita consumption of various foods made in Chapter 2. The purpose here of the estimated food requirements is to assess indirectly the relative degrees of pressure that may be exerted upon the various lines of production in Quebec agriculture. It is not assumed, however, that Quebec can or should attempt to be self-sufficient in food.

Quebec is a surplus area in some farm products: dairy products (especially butter but excluding cheese), farm forest products, maple syrup, blueberries, etc. Quebec is a deficit region, however, in many farm products: pork, beef, mutton, lamb, poultry meat, eggs, feed grains (oats, barley, millfeeds, wheat), various fruits and vegetables (citrus fruit, apples, tomatoes, potatoes), cheese, honey, cigarette tobacco, etc.

Quebec farm products have suffered from insufficient prestige in their own biggest markets. The supermarkets have become influential pacemakers of quality standards in food products. It can be foreseen that increasing attention will also be paid in the future to kinds and quality of food wanted for restaurant eating and tourism.

In view of the estimated increase in Quebec's population from 4,520,000 in 1955 to 8,010,000 in 1980 and of the substantial estimated increases in per capita consumption of certain key farm products for which Quebec is now in a deficit position, (beef, pork, poultry and eggs, cheese, tomatoes, citrus fruit), it is to be expected that Quebec will, in general, remain a deficit agricultural area during the next 25 years. This generalization would apply with special force to a dominant metropolitan market like Montreal. The leading exceptions will likely be most dairy products and farm forest and maple products. The per capita consumption of fluid milk



may decline slightly, and the per capita consumption of butter is expected to decline substantially. A decrease in the per capita consumption of potatoes and apples is also expected.

It is expected that the proportion of Quebec cash farm income derived from livestock and livestock products (including poultry but excluding dairy) will continue to increase; that the relative importance of dairy products will not increase and may even decline; that the decline in relative importance of cash crops will slow down; and that the relative importance of forest and maple products will decline slightly. In other words, the increase in output and price of livestock products is expected to be more rapid than for dairy products. The major impact of the feed grain freight assistance programme on the structural pattern of Quebec agriculture is considered to be tapering off.

Before these projections are examined item by item, the expectations in the use of resources in general in Quebec agriculture need to be set forth. The volume of farm output in general is expected to expand considerably, of course, but by means of greater output per farm, per acre, per animal, and, most important of all, per person engaged in farming, rather than by an increase in farmland, in number of farms, or in farm people. This expectation is based on the beliefs that Quebec farmers, in general, are becoming better conditioned by agricultural extension and education to the adoption of improved farming practices and that the economic incentive for the adoption of known improvements — biological, chemical, mechanical, and cultural — will exist. The impact of these changes upon the economic welfare of the farm people adopting them usually will be to raise their level of living. An effective way to preserve family farming is to help create family farm units with sufficient land, buildings, and machinery to earn enough income to maintain the family at a level of living acceptable to them.

The decline in the total area of farmland which began in Quebec in 1941 is expected to continue for at least another decade. Any increases in farmland in certain areas, due, for example, to colonization, will likely be more than offset over the next ten years by abandonment of farmland unsuited to mechanization and now being used sub-marginally (especially in the Laurentian region and the peninsula area of the Appalachian region) and, to a smaller extent, by industrial and residential encroachments. Although there are said to be millions of acres of cultivable soil in the Laurentian region, the scarcity and small size of the markets and the cool climate strictly limit the prospects there for unsubsidized farming. After 1970, the decline in area of farmland may level off at about 15.5 million acres, owing to the increasing influence of rising food requirements. Compared with 1951, this would represent a decline of land in farms of about a million acres.

The decline in the number of farms is expected to continue, and at a faster rate than the decline in area of farmland. In other words, it appears certain that the average size of farm will begin to increase in Quebec, as it has been doing for some time in Ontario and in Canada as a whole, through a process of consolidation of neighbouring farms and abandonment of small sub-marginal units. The increase in farm size in Quebec may begin slowly, but will continue indefinitely into the future. By 1980, the average Quebec farm may be 135 acres in size. The average size of farm in the St. Lawrence Lowlands may increase by several acres, and the average size of farm in the Appalachian Uplands may increase by a few acres, but the average size of farm in the Laurentian region may not increase and may continue to decline because of the influence of colonizing on farm lots of less than average size and in spite of a partial shift from dairying toward beef raising.

Assuming the existence of 15.5 million acres of farmland, the expected increase in average area of farms would mean about 120,000 farms in 1980, compared with 134,336 in 1951.<sup>80</sup> Assuming six persons per farm, this would imply a farm population in 1980 of 720,000 compared with 792,756 in 1951.

The decline in farm population expressed as a percentage of total population will be rapid as industrialization gathers momentum. The St. Lawrence Seaway Development should accelerate the industrial impetus provided by exploiting vast new mineral and power resources. A farm population of 690,000 in 1980 would be only 8.6% of the estimated total population of the province compared to 19.5% in 1951. The farm labour force may decline to about 156,000 in 1980, that is, 5.3% of the estimated total Quebec labour force, compared with 11.9% in 1955.

The area of improved land is expected to decline by about 249,000 acres. This means that the percentage of total farmland improved is expected to increase from 52.6% in 1951 to 55% in 1980. The improved area in the St. Lawrence Lowlands expressed as a percentage of total farmland in that region is expected to maintain a stable relationship. The improved land as a percentage of total farmland in the Appalachian and Laurentian regions is expected to increase. Neither the total area under crops and pasture in Quebec, nor the ratio of crop to pasture area, may be expected to change significantly.

The average capital investment in Quebec farms is expected to increase in real terms, and the relative values of machinery and livestock are expected to increase at the expense of the relative value of land and buildings.

As far as farm operating expenses and depreciation costs are concerned, the relative importance of the feed and seed bill is not expected

<sup>80</sup> Assuming the same definition of farm as in the 1951 census.

to increase much, but the repair and running costs of farm machinery are expected to increase, relatively, owing to a much greater degree of mechanization. The replacement of horses by tractors will continue apace, with its many ramifications. The additional tractors will release more land now used to produce feed for horses, will save labour, and will enhance yields and quality and reduce risk by the timeliness of operations. The relative importance of the reserve for depreciation account and building repairs may increase slightly. The relative importance of the labour bill is expected to continue to decline, and property taxes are expected to remain in about the same relative position.

### *1. Livestock*

It is expected that hogs will continue to be the most important source of cash income from livestock on Quebec farms. Typically, the hogs will continue to be produced on diversified farms, especially in the St. Lawrence Lowlands, but more specialists in hog raising are to be expected.

Most of the feed grain will continue to come from the West, unless the federal feed grain freight subsidy is cut or dropped. The temporary basis of this policy injects an element of insecurity into the livestock and dairy sectors. A reduced degree of reliance on these western feed grains could be achieved by some substitution of higher protein pastures and harvested forage.

It is expected that over the next 25-year period beef cattle and calves will become the second most important source of cash income from livestock, replacing poultry and eggs. Quebec farms can produce more and better forage and pasture, which are so essential in economical beef production, and the feed grain can be shipped in from the prairies. The St. Lawrence Seaway, by obviating the transshipping of grain, should help to retard rising feed costs.

The biggest beef cattle producing area will continue to be the Appalachian region. Some of the butterfat producers in that region and in the Laurentian region can be expected to convert to beef and veal production. The size of beef farms will probably expand since this is normally a semi-extensive type of farming.

Poultry and eggs will likely be the third most important source of cash income from livestock. The production of poultry and eggs will continue to increase and the quality to improve. The number of large-scale producers of broilers and eggs may increase markedly. Other market centres will probably follow the example of Montreal and Quebec City in passing poultry grading regulations. The sale of eviscerated poultry and young turkeys will continue to increase in popularity. The production of eggs per hen will probably continue to rise, although not as steeply



as since 1950. The production of turkeys will probably continue to expand rapidly.

The relative importance of other livestock products (notably sheep and lambs) as a source of cash income from livestock will probably continue to decline.

The increase in the proportion of cash farm income derived from livestock is expected to be greatest in the Appalachian and Laurentian regions, where the relative importance of dairying is expected to decline.

## 2. *Dairying*

The dairy industry has entered a phase of far-reaching changes which can be expected to make their impact within the next 25 years. Symptomatic of this in Quebec is an increasingly widespread feeling that the Dairy Products Act should be overhauled. There are three main trends shaping the future pattern of Quebec's dairy industry — the declining per capita consumption of butter, the replacing of some fluid milk consumption by concentrated milk products, and the increasing output of milk per cow. The utilization of milk, in contrast with recent years, will be increasingly for fluid purposes rather than for butter, because of the declining relative importance of butterfat in the consumption pattern of Canadians (see Chapter 2). Butter is the weak link of the dairy industry. An increasing proportion of the milk will also be used for concentrated products and ice cream. These trends suggest that the seasonality in milk production will become less marked and that dairying will become still more concentrated in the densely-populated St. Lawrence Lowlands. The butterfat producers in the Appalachian Uplands and Laurentian Plateau regions can be expected to shift toward producing milk for concentrated products and perhaps cheese, or out of dairying altogether and into livestock, particularly beef and pork. The market for a wide variety of quality cheese, now imported, will continue to expand. The per capita consumption of fluid whole milk may decline due to inroads by skim milk powders and perhaps also fluid skim milk and whole milk powders.

The output of milk per cow is expected to continue increasing to 7,000 - 7,500 pounds by 1980, because of better breeding and feeding. The use of artificial insemination and progeny testing, and better forage and higher levels of feeding are expected to become increasingly effective in raising average milk yields per cow. Larger dairy herds and the wider use of milking and other machines will raise output per man.

The net effect of these projected trends will likely be that the relative importance of milk as a source of cash farm income will not increase for Quebec as a whole, and may even decline slightly, although its relative importance may increase some in the St. Lawrence region while declining in the Appalachian and Laurentian regions. Quebec's share in Canada's



milk production may continue to increase. The fact that a cheap, durable, easily transported competing product for perishable fluid milk has been developed in the form of instant milk powders and fresh-tasting evaporated milk is significant. The two hitherto distinct branches of the dairy industry — local fluid markets and national markets for non-fluid milk products — will become more closely interrelated.

### 3. *Crops*

The relative importance of crops as a source of cash farm income has not declined much in recent years. It is expected that this situation will continue. Some important structural shifts are expected within the cash crop picture, however. The relative importance of fruit and vegetables is expected to hold or enhance its position, in spite of keen competition from outside Quebec, owing to improved grading, inspection, warehousing, and merchandising. The production of apples and tomatoes is expected to increase considerably. In the case of apples, this implies the provision of an increasing proportion of the requirements of the province.

Tobacco is expected to increase its share in cash crop income. There is a good deal of suitable soil still available in the St. Lawrence Lowlands for cigarette (flue-cured or Virginia) tobacco cultivation, and there is scope also for increasing yields per acre. Recent strides in the irrigation of flue-cured tobacco are expected to continue.

The relative importance of potatoes is not expected to recover its old position in the face of declining per capita demand and interprovincial competition. Success in this line depends so much on large-scale mechanized operations and on high uniform quality. The relative importance of grain crops (oats, barley, mixed grains, etc.) as a source of cash income from crops is expected to decline further, especially in the Appalachian and Laurentian regions. The yields of these grains are expected to continue to rise. The importance of sugar beets will remain local and small so long as there are more remunerative alternatives. The major role of forage crops will continue to be indirect (as feed on livestock and dairy farms) rather than for direct sale. The yields of hay and other forage crops are expected to increase and the yield and quality of pastures to improve. Better ensiling techniques and improved storage of forage will contribute to improvements in quality. The higher yields expected from crops in general will result from better drainage and tillage, improved varieties and rotations, greater use of chemical fertilizers and lime, better knowledge of soils and meteorological conditions, and a greater degree of control over erosion.

Really good drainage is probably the most important improvement as far as increased productivity of crops on the flat clay loam soils of the St. Lawrence Lowlands is concerned. The removal of the excess water

in the subsoil, especially in the early part of the season, would permit the development of a good root system and facilitate the processes making deeper soil. Not only would crop yields be increased, but a more stable and reliable production would be secured over the years.

#### 4. *Forest and Maple Products*

The proportion of total cash income derived from the sale of forest and maple products is expected to decline slightly over the next 25 years. This is based more on the assumption of a temporarily limited supply of farm forest products, due both to depletion and better conservation practices, than on declining relative prices. The relative importance of maple products may increase in the St. Lawrence and Appalachian regions. Apparently, there are many more maple trees that could be tapped for an expanding United States market.

#### 5. *Farm Policy*

No attempt has been made to forecast specific farm policies over the next 25 years beyond making the assumption that economic efficiency and welfare will receive increasing attention. It is assumed, also, that the forward industrial thrust of the Quebec economy will continue throughout the target period. The status quo of the rural community is increasingly threatened by forces of change both from within and without. Internally, farming is subject to the potent forces of commercialization and mechanization, and externally there are the pressures and attractions of accelerated industrialization and urbanization. If the location of industrialization becomes more evenly distributed, its influence on rural life will be all the more pervasive. In short, the central problem of Quebec farm policy will be to strike a new balance between the rich traditions referred to at the outset of this chapter and economic development.

"It is no longer possible to isolate the rural family in its community; the characteristics of the Quebec farm now make it a self-contained family commercial enterprise. Henceforth, agriculture in Quebec is the result, both of the *way of life* in which people seek first of all their subsistence and that of their families in freedom and the practice of certain traditional virtues, and of *enterprise* in which the motive is profit and which is the source of a standard of living tending to be more and more comparable to that of the city population. That is the price paid for the exchange economy of which the majority of the farmers are henceforth a part."<sup>31</sup>

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<sup>31</sup> Brief from l'Union Catholique des Cultivateurs to the Royal Commission on Canada's Economic Prospects, p. 9.

## ONTARIO

### *I. Introduction*

The agricultural pattern of Ontario, like that of all areas, has been and will continue to be conditioned by factors of three general types. The first type includes such things as climatic and soil characteristics and the nature of the topography, that is, those basic and continuing factors which determine the physical possibilities and limitations of agricultural activity. The second type comprises the influences which are ordinarily referred to as agricultural technological developments. They include the practical applications of research in the various branches of agricultural technology and tend to produce dynamic and sometimes revolutionary effects on production and marketing methods and costs. The third type of influence is primarily economic. In this category are the many things which affect the supply and demand situation of both farm production factors and farm products. Good examples are developments affecting the size, location and availability of markets or those causing changes in the supply of and demand for farm labour. Generally speaking, developments of this sort originate in the non-agricultural sectors, which means that they affect agriculture somewhat indirectly and only because of the interdependent nature of the economy.

In considering these influences from the standpoint of the manner in which and degree to which they are likely to affect the future structure of Ontario agriculture, we conclude that any future changes due to influences of the first general type will be relatively minor. In earlier stages of development it was inevitable that lack of detailed knowledge concerning climatic conditions and soil characteristics should result in a considerable period of trial and error in the attempt to relate the kinds of agricultural activity to the nature of the agricultural resources. However, agricultural techniques are now so developed that most of the necessary information concerning variations in temperature, rainfall, hours of sunshine, soil and topographic

conditions has already been secured either through actual farmer experience or as a result of special research, and the major production adjustments suggested by this information have already been made. While there is obviously much room for further adjustments, most of them must be made on an individual farm rather than a regional basis. They are mostly adjustments that take place gradually as existing knowledge is spread among and applied by individual producers.

As for the other two types of influences, one may be sure that both will bring about many significant changes in the future as in the past. Which of the two types will cause more changes it is difficult to say. In this connection, however, there are one or two points that may be noted. The first is that agricultural technological effort is really undertaken because it helps to provide ways and means whereby farmers may adjust to changes caused by the interplay of economic factors. This suggests that the economic influences are the prime motivators of agricultural changes, whereas the part played by agricultural technology is more or less secondary. It should also be noted that taking advantage of technological developments represents only one method of adjusting to changes instituted by the economic factors. Many farmers, for example, manage to effect adjustment by shifting out of farming altogether, by working harder and longer hours or by voluntarily reducing their living standards.

## *II. Recent and Current Trends and Reasons Therefor*

Some appreciation of how general economic changes affect agricultural developments may be obtained by noting what has happened in recent years. The pronounced wartime and postwar industrial expansion has had a powerful impact on agriculture, leading to changes and developments in employment, technology, land use and production methods.

As the general economic expansion gathered momentum a pronounced increase in non-farm employment at steadily higher wage rates occurred. This soon gave rise to a series of developments on the farm front which had the combined effect of greatly reducing the size of the farm labour force. Increasingly, men who had previously been in the hired farm worker ranks left to accept more remunerative employment elsewhere. Farmers' sons and daughters left the farms to take advantage of the high wages available in non-farm occupations. Many of the farmers themselves decided to work in factories, at building and highway construction, or at other jobs rather than on their farms. In some cases they ceased farming operations altogether while in other cases they continued to live on their farms and carry on kinds of agricultural activity which required their presence for only a small part of each day or year or which could be carried on by making occasional use of machinery on a custom basis. The net effect of these movements was that between June, 1946, and June, 1955, the Ontario farm labour force fell from 334,000 to 248,000.



But if non-farm employment at increasingly remunerative wages caused a large reduction in the farm labour force, it also created special and serious problems for all those operators who tried to continue farming as usual. As the farm labour supply declined these people were forced to adopt any one or more of four alternatives. They could try to get the amount of labour to which they had become accustomed by offering wages and working conditions roughly equivalent to those being provided by other employers. They could undertake to substitute machines for men, adopt labour-saving devices and, in general, re-arrange the farm programme to the end that less labour would be required to achieve the production results. In the third place they could shift to types of farming which required less labour. A final choice lay in continuing with the same type of farming and farming methods but limiting production to what could be turned out by the smaller quantity of labour that was still available. In actual practice all four of these methods have been used extensively either separately or in combination. Some of the consequences of following these several courses may now be noted.

To the extent that farmers have managed to keep their labour supply unchanged by paying higher wages, their total and unit costs of production have been substantially increased. The actual extent of this increase may be gauged by examining the figures in the following table.

Table 64

**AVERAGE WAGES OF MALE FARM HELP IN ONTARIO**  
(as of January 15, 1940-55)

Year	Per month with board	Year	Per month with board
1940.....	\$22.04	1948.....	\$69.43
1941.....	27.52	1949.....	71.48
1942.....	37.82	1950.....	66.00
1943.....	46.16	1951.....	77.00
1944.....	51.02	1952.....	87.00
1945.....	53.96	1953.....	83.00
1946.....	57.06	1954.....	84.00
1947.....	63.92	1955.....	84.00

SOURCE: Agriculture Branch, D.B.S.

As the table indicates, farm wage rates have almost quadrupled during the 15-year period. This rate of increase is far greater than that of any other important farm cost item. Indeed the figures show that farm wage rates have risen almost twice as fast as prices of commodities and services used by farmers considered as a group.<sup>1</sup>

<sup>1</sup> When figures in the table are compared with those in recent issues of *The Economic Annalist*, Canada Department of Agriculture.

### 1. *The Trend toward Mechanization*

That farm labour has been replaced by machines in wholesale fashion and that farmers have made widespread use of labour-saving devices becomes obvious when it is realized that there were nearly two and a half times as many farmers using electricity in 1954 as ten years earlier and that the number of farms supplied with electricity in that year was 90% of the total number of farms recorded in the 1951 census. This expansion in the number of farm users becomes doubly significant when it is further noted that the average consumption of electricity per farm increased from 167 kilowatts per month in 1944 to 347 kilowatts in 1954. This increase was accompanied by a corresponding expansion in the amount of electricity-using equipment. Between 1941 and 1951 the number of farms reporting electric motors increased from 22,681 to 44,657, while the actual number of motors rose from 40,137 to 84,679. Similarly, the number of electrically operated milking machines increased from 4,015 in 1931 to 38,740 in 1951.<sup>2</sup> If corresponding figures were available for other forms of equipment, such as electric heaters, milk coolers, electric pumps, electric feed grinders and electric fences, to say nothing of such important types of household equipment as electric stoves, washing machines and refrigerators, it would be readily seen that the total amount of electrical equipment added in recent years has been very great indeed.

In addition to mechanical power and equipment of the types just mentioned, which are mainly related to the performance of farm chores, there has been an even more rapid increase in the use of new mechanical methods of doing the field work connected with producing and harvesting the various crops. Indeed it is in this sphere that the most spectacular mechanical innovations have occurred. This is mainly because field operations have thus far proved more suited to use of the mechanical method than other kinds of farming activity. Important new machines which have become increasingly common include the various types and sizes of tractors, grain combines, hay balers, forage harvesters, corn pickers, chemical weed sprayers, sugar beet pullers, manure loaders and the planters, sprayers, diggers and baggers used in potato production. Some idea of the rate of mechanization may be obtained by noting that, between 1941 and 1951, the number of tractors in Ontario increased from 35,460 to 105,204, the number of combines rose from 796 to 10,031 and the total value of farm machinery expanded from \$150 million to \$445 million.<sup>3</sup>

This mechanization development has meant wholesale substitution of tractor for horse power as well as a substitution of machines for men. This, in turn, has meant a pronounced decline in the horse population. From close to 800,000 in the second decade of the century, horse numbers had

<sup>2</sup> *Census of Canada, 1951*, Vol. 6.

<sup>3</sup> *Census of Canada, 1951*, Vol. 6.

fallen to 176,000 by 1954, with most of the decline occurring in the last ten years.<sup>4</sup>

Of even greater importance than the mechanization trend itself is the explanation of why it has been taking place. The explanation would appear to be twofold. Without doubt the main reason is the economic one. Farmers have felt that the mechanical method offered the cheapest way of getting work done. Even though very expensive, machines have appeared relatively low-priced when compared with the high and continually rising wage rates. After all, the cost of labour has quadrupled since the start of World War II, whereas the cost of machinery, gas and oil has less than doubled. Moreover, the cost of electric power has actually fallen during this period. Between 1929 and 1944 electricity rates in rural Ontario were cut by more than half because the government undertook to pay up to 50% of the cost of building the lines and installing electrical equipment in rural areas.<sup>5</sup> It should be noted, however, that much mechanization has occurred in addition to that which can be traced to deliberate cost calculations. Part of it has been due to a desire of many farmers and their wives to eliminate various non-monetary problems connected with the employment of hired help, and to a distinct preference of certain farmers, and particularly the more mechanically minded ones, for the mechanical rather than the non-mechanical method of doing work. Moreover, quite a few farmers have been virtually compelled to obtain mechanical equipment as a means of inducing sons to remain on the farm. Similarly, installation of much household electrical equipment has reflected the normal and ever-present desire of farm housewives to obtain working methods and achieve living standards comparable with those which have long since prevailed in urban centres. Finally, a good deal of the recent farm mechanization can be explained in terms of the pronounced improvement in the farmer's general financial position. Many farmers have bought more machinery than previously simply because they were more able to do so.

As mentioned earlier many farmers attempted to adjust to the worsening labour situation by installing devices or making other changes designed to reduce labour requirements. Labour-saving devices have included hog and poultry feeders, special feed chutes, pen-type barns, use of deep litter in poultry houses and relocation or alteration of buildings to reduce steps, make use of the gravity principle, etc. Moreover, stones and stumps have been removed and the shape and size of fields has been changed to reduce time spent in field operations. Some of the more important changes such as construction of the new types of barns or re-arrangement of fields have been designed to minimize building costs and obtain fuller use of expensive machinery as well as to reduce labour requirements. Where erection of new

<sup>4</sup> *Agricultural Statistics for Ontario, 1954.*

<sup>5</sup> *Hydro on the Farm* published by the Ontario Hydro-Electric Commission, 1948.

or reconstruction of old buildings has been necessary, special attention has been paid to both the labour-saving and capital-saving possibilities.

It has not been possible to choose the alternative of shifting to types of farming requiring less labour to more than a limited extent. Apart from the inability to undertake all types of farming in all parts of the province, no significant shift toward a particular farming type requiring less labour can occur without unduly expanding supply and thereby destroying the profit-making opportunities in the area concerned. In practice the most common shift has been from dairy or general mixed farming to beef cattle raising. While such a shift has been aided somewhat by the prevalence of exceptionally good markets for beef in most postwar years, it has tended to prove feasible only in cases where farmers were not completely dependent on farming for a livelihood. Among such farmers have been a considerable number who have been securing part of their income from non-farm employment. Much the same general comment may be made regarding the remaining method of adjusting to the scarce and high-cost labour situation, namely, the plan which has involved curtailing the scale of farm operations. For the most part this plan has been resorted to by a certain number of older farmers whose sons were already living and working elsewhere and who were, partly for this reason, able to maintain a satisfactory living standard despite a considerable reduction of farm output and income.

## 2. *The Trends in the Acreage per Farm*

Census returns indicate that a gradual but continuous increase in the average number of acres per farm has been occurring since 1911. This expansion in the average size of farm has been accompanied by a corresponding reduction in the number of farms. Between 1911 and 1951 the average size of farm increased from 104.5 to 139.2 acres while the total number of farms declined from 212,108 to 149,920. Moreover, during this period the total area in farms remained substantially unchanged until the 1941-51 decade, during which a reduction of some million and a half acres took place.

It is doubtful whether the figures showing average acreage per farm indicate the full significance of what has been happening. Further examination of census data shows that there has been a steady drop in the number of all farms containing less than 100 acres and a steady rise in the number and percentage of all farms containing more than 100 acres.<sup>6</sup> Moreover, while all farms with less than 100 acres have declined in number throughout the 40-year period, the most rapid decline occurred between 1941 and 1951 and in respect of that particular class which contained between 50 and 100 acres. Prior to this decade the drop in the number of farms in this class was quite limited. On the other hand, while all farms with more than 100 acres have continuously increased in number, those containing over 200

<sup>6</sup> *Census of Canada, 1951, Vol. VI, Part II.*



acres have increased most rapidly during the 1941-51 decade. The really significant thing is that, during this decade, the percentage of farms with over 200 acres has increased from 11.4% to 15.9%. Even more significant is the fact that, by 1951, less than 16% of the farms had become large enough to account for nearly half the farm acreage of the province. And, since the main reason for the increase in size of this particular group of farms has been the superior financial resources and managerial capacity of their owner-operators, it seems reasonable to assume that they are responsible for at least half of the total agricultural production.

There is a direct relationship between the trend toward larger farms and the trend toward increased mechanization. The connection is particularly marked where larger and more expensive machines are involved and where substitution of tractor for horse power has occurred. It was not until the labour shortage gave an impetus to mechanization developments during World War I that any noticeable increase in size of farms took place. So too it was not until the labour shortage and high wage rates of the 1940's caused a speeding up of the development and use of newer and larger kinds of machines that the most pronounced increase in both the average size of farm and the number of farms in the larger sizes took place. This connection between increased mechanization and increase in farm size is perfectly logical on both technical and economic grounds. Since the usual size of tractor is capable of providing considerably more power than the number of horses which it displaces on an average farm, many farmers have found that they had a technical surplus of power over and above what could be used effectively on their existing acreage. Hence it has often been necessary to increase the farm acreage if a proper technical fit between tractor and land was to be secured. The same is true of the combining of land with the various types of machinery. From an economic standpoint it is usually desirable to buy a larger rather than a smaller machine and even more desirable to use it to as near full capacity as possible by combining it with the requisite amount of land. A large machine costs considerably less than twice as much to make and sell as one with half the capacity. On the other hand the larger machine represents a much larger fixed investment. And this investment can only be kept consistent with a low per unit cost of product if the machine is quite fully used, that is, combined with a fairly large acreage. Another very important point is that the same worker who is needed to operate a small machine is ordinarily quite capable of operating a larger one. This, of course, means that labour productivity tends to be at its maximum when large machines and large acreage are combined.

It should be pointed out that the average size of farm would have become considerably larger than it has were it not for two things. The first is that many farmers would have added to their acreage but for the fact that additional land was either not available in a suitable location or that those who owned it refused to sell for various reasons. In the second place the

possibility of doing or having mechanical work done on a custom basis has made it unnecessary for some farmers to enlarge their farms. It has permitted one type of farmer to get along with relatively small land area simply because he has not had to buy machines of his own, and it has enabled other farmers to keep their land area small even though they have invested heavily in machinery simply because they have been able to use this machinery to the necessary degree of capacity by doing custom work for neighbouring farmers. It is significant that 95,670 Ontario farmers reported an expenditure of \$13,520,000 on custom work during 1950.<sup>7</sup>

### 3. *Farm Business Organization Trends*

Despite the increase in the acreage and scale of output of farms, no significant alterations in the general manner in which the farm business is organized, financed and controlled have occurred. In almost all cases farming has continued to be conducted on an individual rather than a corporation or even a partnership basis. That such is the case is evident from the fact that there were still 149,920 farm business units in 1951. Moreover, the traditional institution known as the family farm has continued to prevail. Thus the growth in the number of larger farms has not been accompanied by any noticeable change in the ownership and organizational set-up. There has, however, been a rather pronounced use made of voluntary business arrangements between farmers and members of their families. These are currently referred to as father-and-son agreements. They provide for joint performance of the financial and managerial functions and generally provide for gradual transfer of title to the farm property. Such arrangements have become increasingly necessary as farm capital requirements have increased and as opportunities for farmers' sons to leave the farm have become more numerous and financially inviting.

Thus far corporation farming has made little headway in Ontario. Certain feed companies have raised broilers on a semi-factory basis in recent years. Indeed there are a few isolated examples of company owned and operated farms of various types. Their scale and operating methods vary little, if any, from what is found on other farms.

While the possibilities of co-operative farming have been considerably discussed, we are aware of only one case where the co-operative plan has been put into actual practice. There has, however, been some increase in the number of cases where performance of specific types of activity has been undertaken by several farmers on a co-operative basis. The most common examples relate to ownership and operation of certain kinds of machinery. This type of co-operative action represents one more attempt to obtain the advantages without the disadvantages of using the more expensive kinds of newer machines.

In connection with the control and management of farms, two further significant developments may be noted. The first is an appreciable drop in the number of farms operated by tenants. From just over 21,500 tenant-operated farms when the 1931 and 1941 censuses were taken, the number had declined to 8,852 by 1951. It may also be noted that the percentage of occupied farm land operated by the owners rose from 85% to 89.2% between 1941 and 1951. Many of those who operated farms on a rental basis in the earlier periods have quit farming altogether, while much of the land which was rented by them has been abandoned. On the other hand it seems equally certain that, where such land was reasonably fertile and level and close to the property of well-established full-time farmers, it has often been purchased by the latter and so contributed to the increase in size of the larger farms. The other development has been the steady, if not rapid, increase in the number of farms operated by a manager rather than the owner. The number in this class has risen from 749 in 1931 to 1,629 in 1941 and to 2,628 in 1951. Most of these farms have been bought by well-to-do urban residents and are located within a relatively short distance of the larger cities.

#### 4. *Land Use Trends*

One of the most important effects upon agriculture of the industrial and general economic expansion has been the reduction in the amount of land being farmed. The economic development has brought about this reduction in two ways. It has caused land formerly used for agricultural purposes to be bought and used for industrial and residential sites, for road and highway building, for airports, etc. And, by providing an alternative form of employment for many of the marginal farmers, it has caused a lot of land to go out of agriculture altogether and other land to be farmed less and less intensively. That the reduction in area has been primarily due to the economic expansion is suggested by the fact that, whereas the total area in farms remained substantially unchanged from 1911 to 1941, it declined by no less than a million and a half acres or 6.7% between 1941 and 1951.<sup>8</sup> The reduction of improved as distinct from occupied land was slightly over 5%.

Having noted the extent of this acreage decline, something may be said regarding the area transferred from farming to meet the needs directly associated with the industrial expansion and also the area of abandonment, most of which has been indirectly due to that expansion. While the first type of area constitutes a relatively small part of the total when considered on an acreage basis, its removal is significant when viewed in the light of production possibilities. This is partly because much of the land taken over has been choice fruit and vegetable land in the Oakville, Burlington and Hamilton districts, and partly because all farms transferred were particularly well

<sup>8</sup> *Census of Canada, 1951, Vol. VI, Part II, Table I.*



located in respect to markets. Whether they were adjacent to the Lake Ontario shoreline or at more inland points, they were normally close to cities or towns. While there seems general agreement that the total area taken over for these purposes forms a distinctly limited part of the total acreage reduction, the fact remains that there are few highways along which farmland has not been given over to other uses and few towns of any size that have not managed to add one or more new industries. Moreover, the accelerated rate of industrial expansion in the last few years makes it obvious that the number of well-developed and well located farms transferred to non-agricultural uses has been rapidly increasing since the 1951 census was taken.

By far the larger part of the decline in farmland area has been caused indirectly by the general economic expansion. Farms have been vacated either because the operators found it difficult or impossible to compete as production costs increased or because alternative and financially more attractive forms of employment became available. Thus most of those who have quit farming have been either forced or induced to do so. In either case a study of the data indicates that most of those who left the land did so because they were operating the most marginal land or because they were the most marginal farm managers or both. The land may have been marginal in the sense that it lacked fertility, or because the topography or shape and size of the fields did not permit efficient use of machinery and labour, or because it was poorly located with respect to markets and transportation facilities. To the extent that the land vacated was the most marginal land, the mere fact that a sizable reduction in the farming area has occurred is not likely to cause any serious reduction in total agricultural output. This is even more apt to be the case inasmuch as many of the abandoned farms were in sections of the province where the percentage of occupied land capable of being improved and thus put into the producing category has been relatively small. This explains why land abandonment has meant a reduction of 6.7% of the occupied but only 5% of the improved land.

While the aforementioned reductions in farm acreage have been occurring, some of the remaining occupied but unimproved land has been added to the productive area. Small areas previously unimproved and uncultivated have been cleared, drained or otherwise reclaimed. In the aggregate, however, the improved acreage added in this way has been very small compared to the reductions referred to above. In only 4 of the 55 counties or districts was there a net increase in the improved land area between 1941 and 1951. Moreover, the net increase in these 4 counties was only 28,884 acres compared with a net decrease of 670,111 acres for the whole province.

Land improvement tended to occur only where land was unusually fertile, particularly well located in respect to markets, or so located that it could be used for types of production that promised a high dollar income



per unit of area. That is, it was generally land capable of yielding large financial returns in comparison with the cost of obtaining and improving it. Moreover, it was generally held by farmers who possessed more than the average degree of operating efficiency.

If some land has been abandoned or shifted to non-agricultural uses, all the remaining land has been subjected to considerable changes in the specific uses to which it has been put. Perhaps the most significant change has been a gradual increase in the proportion of the total field crop acreage devoted to forage crops. Despite a drop of a million acres in the total field crop area between 1935-39 and 1950-53, the area in forage crops declined by only 158,750 acres. No less than 57% of all cropland was in hay and pasture in 1954.<sup>9</sup> This change has been due to several factors. For one thing there has been an increasing appreciation of the climatic advantages which the province possesses for forage production and an increasing realization of the comparative advantages which western Canada possesses in grain production. In the second place the granting of freight assistance on Western feed grain by the Dominion government during the past 15 years has added appreciably to the extent to which Ontario's feed grain requirements were met by shipments from western Canada. These shipments have varied from just under 35 million to over 69 million bushels in each of the past seven years.<sup>10</sup> Finally, the tendency to expand the forage crop acreage is a natural accompaniment of recent government-sponsored programmes aimed at reducing production costs by substituting more and better forage for expensive grain supplements.

While the percentage of the total cropland devoted to grain production has fallen slightly, the main change has been in the kinds of grain grown. Whereas fall wheat acreage has tended to remain unchanged throughout the present century, the acreage in spring wheat, oats, barley, buckwheat and peas has been declining steadily for many years. The drop in oat and barley acreage was accompanied by an expansion in the production of mixed grains. The mixed grain acreage has been expanding fairly continuously since World War I, and, since 1948, it has exceeded the million-acre mark. The shift from oats and barley to mixed grains has resulted because the growing of grains in the mixed form made more complete use of the fertility and space contained in a given amount of land than was possible if each type of grain was grown separately. This fuller use, in turn, increased significantly the total number of pounds of grain obtained from each acre. Another important change concerns the acreage devoted to corn for husking. Here an acreage reduction trend which had been under way from the turn of the century to the start of World War II was halted by development of new

<sup>9</sup> Chart prepared by Farm Economics Branch, Ontario Department of Agriculture, Nov., 1955.

<sup>10</sup> Figures collected by Field Crops Branch, Ontario Department of Agriculture.

hybrid varieties. These greatly increased the yield per acre and contributed to eradication of the corn borer. As a consequence the corn acreage has expanded by about 265,000 acres since 1940, with most of the increase occurring during the past five years. The general result has been that production of shelled corn, which varied between three and eight million bushels during the 20's and 30's, rose to almost 22 million bushels by 1954. Other changes in the kinds of grain grown have been much less significant.

A general indication of the effect of the foregoing changes plus yield changes on total grain supplies can be obtained by comparing the combined production of the several kinds of grain (excluding flax and beans) during the 1935-39 period with that in 1950-53. Such a comparison shows that the total annual production of grain rose from 158,851,600 bushels in the earlier period to 176,920,000 bushels in the later one. The increase of just over 18 million bushels was mainly due to increases in the production of mixed grain and corn.

While total acreage in crops other than those already mentioned is relatively small, recent changes in this acreage may be mentioned here partly for the sake of completeness and partly to indicate some quite definite trends. Between 1935-39 and 1950-53 there was a 75% reduction in the area devoted to field roots owing mainly to the growing scarcity and increased cost of farm labour. Between the same two periods there was a decline of 74,850 acres or 51% in the Ontario potato acreage. Sugar beet acreage remained fairly constant at around 32,000 acres until the last two or three years since when it has fallen to about 23,000 acres. On the other hand soybean production has risen from 41,500 acres in 1942 to 254,000 acres in 1954 with all but 12,000 acres of this being in six southwest counties. During the same 12-year period (1942-54) tobacco acreage increased from 67,830 to 120,804 acres. Indeed, all but a minor part of this area was planted to the flue-cured variety which was not produced in Ontario until the late 1920's. Use of land for tobacco production has meant only minor reduction of the crops formerly produced on this land. The reason is that land which has proved ideal for growing tobacco was distinctly submarginal from the standpoint of the purposes for which it was previously used.<sup>11</sup> A final significant development has been the increase in the area devoted to vegetable and fruit production. This increase, which has been gradual but quite definite, reflects the recent increase in the Canadian per capita consumption of fruit and vegetable products. Between 1941 and 1951 the Ontario vegetable area increased from 68,444 to 98,415 acres, the area in tree fruits from 79,206 to 80,726 acres and the area in small fruits from 7,484 to 29,731 acres. The small expansion in the tree fruit area is explained by a relatively wholesale reduction in the apple orchard area.

<sup>11</sup> All the foregoing statistics were obtained from the annual reports of the Statistics Branch, Ontario Department of Agriculture.

### 5. *The Trend toward Increasing Specialization*

While physical and economic factors have always dictated a considerable degree of regional specialization, Ontario's agriculture has traditionally been diversified. The majority of farmers have normally combined a variety of enterprises. Mixed farming was regarded as something that would help to spread the risk of crop failure and declining prices and incomes, that would increase the possibility of using labour to capacity, and that would permit the following of scientific rotations and hence the maintenance of soil fertility.

While agricultural diversification is still widespread, recent years have seen a marked trend in the opposite direction. This increased specialization has taken several forms. For one thing farming has become more specialized on a regional basis. The growing of crops like tobacco and potatoes has been more confined to areas where special soil and climatic conditions can be met. Fuller advantage has been taken of the early spring, long growing season, high temperature and rich soil which are found in the extreme south-western part of the province and which are especially suitable for producing early fruits and vegetables. Similarly there has been a growing tendency for the production of cash crops like soybeans, white beans and sugar beets to be concentrated in a few southwestern counties where soil and climate are particularly suitable.

It is, however, the tendency to shift from generalized or diversified farming to a more specialized type that has been the chief characteristic of recent developments. The actual extent of the shift has varied. In many cases the farmer has reduced the number of his enterprises from four or five or half-a-dozen to two or three. In other instances, however, he has decided to concentrate on a single enterprise such as whole milk production, beef raising or poultry farming. There has also been some tendency to reduce the number of functions performed in connection with each specialized type of farming. More whole milk producers, for example, are buying herd replacements rather than raising them. Similarly more beef cattlemen secure their feeder stock from western Canada instead of raising them. The practice of buying specially bred chickens from specialized hatcheries has become well-nigh universal. The system whereby each farmer raised all the pigs which he finished has been partially replaced by the practice of having some farmers raise pigs to the weaning stage when they are sold to other farmers who finish them. A start has also been made toward developing recognized pig hatcheries. Functional specialization has also made rapid strides in supplying livestock feeds. In recent years purchased feeds have gone far to replace those produced by the farmer himself. Many whole milk shippers buy all their feed grain requirements. To an increasing degree hog producers have been relying on commercially produced pig starters and growing rations. Specialized egg and poultry producers now place all but complete reliance on the chick starters, growing mash, laying mash and



other feeds prepared in accordance with special formulas by commercial feed companies. The quite extensive dependence on western Canadian grain has also developed since the early 1940's.

That farmers have been reducing the number of enterprises in their farm programmes and carrying on those which remain on a larger scale is indicated by the following 1951 census data. The figures show that between 1941 and 1951 the number of farmers growing potatoes dropped from 123,615 to 64,951; the number growing oats declined from 111,661 to 87,743; the number growing barley fell from 43,921 to 18,489; the number of farms reporting sheep dropped from 24,305 to 11,338; the number reporting swine declined from 121,349 to 93,564 and those with cattle from 150,427 to 120,899. This suggests that production of at least some products has been getting into a lot fewer hands. The fact that this smaller number has not been accompanied by a corresponding reduction in total output indicates that they have been operating on a much larger scale than formerly.

Increased specialization can be explained on three grounds. Investment in large and expensive machines designed for a special purpose has forced many farmers to enlarge the scale of particular types of agricultural activity in order to reduce the per unit cost of buying and using the machines. Investment in specialized machinery has become such a large part of total farm investment that many farmers have had to concentrate on the kind of farming for which the machines are specially designed. In the second place, farmers have found that their only hope of meeting the increasingly keen competition lies in securing all possible technical knowledge, spending more time on direct personal supervision, using the most scientific methods and securing whatever added economics may result from operating on a larger scale. Finally, in order to be most proficient and keep really up to date regarding scientific developments in each type of enterprise, farmers have had to confine their attention to fewer enterprises.

#### 6. *The Trend toward More Intensive Farming*

Several developments in recent years indicate that agricultural production methods are becoming more intensive. For one thing total Ontario sales of fertilizer materials and mixed fertilizers combined have risen from 147,970 tons in 1940 to 274,506 tons in 1948 and to 428,738 tons in 1955.<sup>12</sup> This rate of increase is much greater than that for Canada as a whole. Between 1948 and 1955 the over-all Canadian sales increase was only 21% compared with 56% in Ontario. In fact Ontario sales have made up fully half the national total. Moreover, every county in the province has made at least some increased use of fertilizer. Despite this it is significant that nearly three-quarters of the entire amount sold in the province has gone to farmers in some 12 counties. By far the larger part has been

<sup>12</sup> From annual issues of *The Fertilizers Industry*, D.B.S.



used in areas where cash crops such as tobacco, sugar beets, soy and white beans, potatoes and corn are grown. Some fertilizer has also been used in growing fall wheat. Generally speaking any fertilizer not applied when growing wheat or cash crops has been used for pasture improvement.

The increased use of fertilizers has been mainly due to the fact that fertilizer prices have risen far less than prices of other farm producer goods and services and of the farm products themselves. Fertilizer prices have risen by only 82% since before World War II while prices of commodities and services used by farmers considered as a group and prices of farm products have considerably more than doubled during the same period. The wide differential which has existed between the rise in the price of beef cattle and the rise in fertilizer prices goes far to explain why so much more fertilizer has been used on pastures. Additional reasons, of course, have been the rather pronounced improvement in the quality and increase in the quantity of forage in the form of pasture that has commonly resulted from a relatively small application of fertilizer and the growing appreciation of the place and importance of pasture as a livestock feed.

In addition to what has just been said the increased use of fertilizer has been definitely and positively related to rising land values. It is significant that the really large-scale users of fertilizers are located in sections where land values have risen pronouncedly in recent years. The more land values have risen the more it has become necessary to use each acre as fully as possible by combining other more variable and relatively inexpensive factors such as fertilizer with it.

Another indication of growing intensification is found in recent pronounced increases in the installation and use of irrigation facilities. According to the 1951 census Ontario had 5,075 acres of irrigated land in 1950. While this acreage was spread over 28 counties, most of it was located in about a third of that number. From available evidence regarding more recent developments, it is clear that in certain sections at least a decided expansion in the use of irrigation has occurred in the last few years. For example it has been estimated that between the beginning and the end of the 1955 crop season the number of irrigation systems on the 4,200 flue-cured tobacco farms spread over 12 counties increased from between 600 to 700 to around 1,800, or by 192%.<sup>18</sup> A steady if less spectacular growth in the use of irrigation has also taken place in widely scattered sections and particularly in areas where the crops grown have had a high acre value. Indeed there is every indication that the rate of irrigation would have been far greater but for the inability to secure the necessary water supplies. It has been stated, for example, that only 4%

<sup>18</sup> Statistical data obtained in private correspondence with officials at Dominion Experimental Station at Delhi, Ontario.

of the 80,000 acres of light-textured land in Essex county is irrigated at present and that failure to irrigate the remaining 96% has been due mainly to lack of water.<sup>14</sup>

Irrigation use has expanded for several reasons. In areas like Essex and Kent counties, large and frequent moisture deficiencies have made it necessary to supply water artificially. Essex has the lowest annual rainfall and is subject to the highest temperatures of any part of Canada east of the Prairies. A recent study<sup>15</sup> shows that the average moisture deficiency at the Harrow Experimental Farm over a 26-year period has been 6.9 inches and that this deficiency occurred between late June and late September. It also shows that in only two of the 26 years was the deficiency less than four inches and that in seven years it was over ten inches. The results showed that the greatest deficiencies can be expected in July at the very time the early crops are maturing and the later ones are normally doing most of their growing.

But if the need for irrigation as insurance against insufficient natural rainfall is particularly urgent in Essex and Kent counties, it exists to some degree in almost all districts. The costs of providing the land, the labour, the fertilizer and the seed have become so large that many farmers simply cannot afford to run the risk of crop reduction because of insufficient moisture. In such cases irrigation is needed if only to ensure that the other production factors for which outlays have already been incurred are used to something approaching full capacity.

There is also the fact that some of the soils best suited to growing the most valuable crops dry out very quickly and are therefore unlikely to retain enough moisture to produce the highest yields of which they are capable even in the wettest seasons. This means that such soils will always give higher yields if extra water is provided through irrigation. It is also the case that some crops require far more moisture than others. Besides, crops differ widely in respect to the time of year when they can use moisture most effectively. And, since rainfall does not occur evenly, rain which falls when crops are unable to use it is often lost through surface runoff or sub-surface drainage.

While the foregoing explanations go far to explain the expanded use of irrigation, other factors are partly responsible. The possibility of selling farm products, and cash crops in particular, at high prices in recent years has increased the economic worthwhileness of irrigating. Similarly the enjoyment of more than ordinarily profitable years has given farmers more funds with which to purchase irrigation equipment. Increased publicity and competition on the part of the companies which sell this equipment

<sup>14</sup> From a report prepared in 1955 by the Southwestern Ontario Branch of the Agricultural Institute of Canada.

<sup>15</sup> See article by Marie Sanderson in *Scientific Agriculture*, June, 1950.

has probably exerted considerable influence. Without doubt there has also been a close correlation between the length of a drought period and the number of irrigation systems sold. This was particularly evident during the prolonged drought of the 1955 season. Finally, farmer interest in irrigation has been stimulated by the discovery that certain valuable but unforeseen results may result from its use. Tobacco growers, for example, have learned that irrigation has always raised the grade of the crop; that the irrigated crop matures much earlier, thus permitting completion of harvesting before frost damage occurs; and that, where harvesting has not been finished before frost arrives, frost damage can be avoided by using the irrigation equipment to wet the leaves of the plants. Many crops were saved in this way in 1955.<sup>10</sup>

Still other indications that agriculture is becoming increasingly intensive include the recent tendency to control weeds more completely by using chemical methods, the similar tendency to eliminate more completely losses caused by insects and fungus diseases through increased use of insecticides, the continued attempt on the part of government and farmers alike to increase production through more and better drainage, the tendency toward more thorough cultivation and the increased attention given to livestock feeds and feeding methods to the end that the optimum kinds and amounts of feed will be combined with the livestock.

#### *7. The Trend in Production per Acre and per Unit of Livestock*

The growing intensity of production just indicated has resulted in increased output per acre and per unit of livestock. Tobacco yields, which varied from about 800 to 1,200 pounds per acre until very recent years, have ranged between 1,400 and 1,600 pounds during each of the last three or four years. This increase has apparently been mainly due to the expanded use of irrigation and higher yielding varieties since this crop has always had to depend on heavy application of commercial fertilizers. Though subject to pronounced year-to-year fluctuations, potato yields in recent years have been far above the long-run average. During the past 15 years total production has remained relatively unchanged even though total acreage has been cut in half. The yield increase has been particularly marked in the last seven or eight years during which time growth in the specialized basis of production has been accompanied by a special government programme designed to increase yields. Yields of several cereal crops have also increased. The latest ten-year average yields of fall wheat, spring wheat, oats, barley, rye and mixed grains are significantly higher than the preceding ones. Most marked were the increases in respect of fall wheat, oats, rye and mixed grains, the rates of increase in these cases being 13, 16, 14 and 17% respectively. Much

<sup>10</sup> Statement made by official of the Delhi Experimental Station in private correspondence.

more pronounced have been the recent yield increases of corn for husking which have been mainly attributed to the development and rapid spread of new hybrid varieties.

The yields of hay and pasture crops have also shown steady improvement. While the decennial averages show a continuous if moderate increase during the last 40 or more years, the improvement since 1940 has been really quite significant. And, since the pasture improvement programme involving more careful selection of special varieties for particular climatic and soil zones, expanded use of commercial fertilizers, etc., is really only getting properly under way, one would expect that future yields will greatly surpass those of the present.

Still further evidence that more intensive, specialized and scientific methods have increased output per unit is supplied by figures showing milk production per cow and egg production per hen. While the average production per cow for all cows in the province is little over 5,000 pounds, definite progress has been made toward increasing the production per cow in the rapidly expanding number of dairy herds that are co-operating in the Ontario Dairy Herd Improvement Association programme. From 1951 to 1954 the number of cows qualifying for certificates under this programme varied from 10,643 in the first year to 17,126 in the last. During the same four years annual production per cow increased from 7,954 pounds in 1951 to 8,616 pounds in 1954. It has also been found that, in Dundas county between 1917 and 1948, heavier feeding and improved breeding resulted in more milk being produced from the same number of cows.<sup>17</sup> Far more spectacular, however, has been the increase in the egg production per hen. While this increase has been continuous for several decades, the actual rate of increase has been quite small and gradual until the last few years. An idea of recent happenings may be gained by noting that production jumped from 153 eggs per hen in 1947 to 193 in 1953.<sup>18</sup>

#### 8. *Labour Productivity Developments*

Between the start of World War II and 1954 the number of agricultural workers in Ontario declined 27% while the physical volume of agricultural production increased 28%. A calculation of the combined effect of the drop in number of workers and increase in production shows that the output per worker was 75% greater in 1954 than before the war.

This pronounced gain in labour productivity resulted from a combination of developments, most of which have been indicated in preceding sections. These include a wholesale substitution of machines for men, an expansion in yields due to increased fertilization and irrigation, higher

<sup>17</sup> See study entitled: *Agriculture in Dundas County, Ontario between 1917 and 1948*, undertaken by Economics Division, Canada Department of Agriculture.

<sup>18</sup> Canada Year Books.



yielding varieties of seed, more effective control of weeds and general improvement in agricultural technology, rearrangement of fields and buildings so as to increase labour effectiveness, and elimination of large numbers of marginal farms on which labour was not very productively employed. The influence of mechanization alone can be appreciated by noting that the value of farm machinery per worker rose from \$556 in 1941 to \$2,189 in 1951, that the number of tractors per worker increased from .1 in 1941 to .5 in 1951, and that the number of milking machines per worker increased from .01 in 1931 to .1 in 1951. Moreover, the number of improved acres per worker, which was 43 in 1931 and 49 in 1941, had risen to 62 by 1951.<sup>19</sup>

The actual rate of increase in labour productivity has varied with the type of agricultural activity. Whereas a worker was able to produce more than three times as much grain and two and a half times as much livestock, he was only able to double the production of vegetables during the 1940-50 decade. This fact, together with the additional one that a steadily larger part of the labour force will probably be engaged in producing small fruits and vegetables and foods like milk and eggs which require a lot of labour, suggests that future labour productivity gains may be somewhat less rapid than those of the recent past.

#### *9. The Trend toward Increased Capitalization*

Recent years have seen a pronounced expansion in farm capital requirements owing largely to changes in farming methods. Mechanization developments in particular have added greatly to the total fixed investment. The total provincial investment in mechanical equipment increased from \$150 million in 1941 to \$445 million in 1951 or approximately 200%. A much larger increase would doubtless be shown if figures representing the present situation were available. The upward trend in capital requirements is also shown by comparing the total farm capital figures for the years 1941 and 1951. The total value of the land, the farm buildings, the machinery and equipment and the livestock increased from \$1,189,-600,261 to \$2,824,396,000 during the decade. Division of these totals by the total number of farms shows that average capital requirements rose from \$7,115 per farm in 1941 to \$18,839 in 1951.

Determination of the total change in capital requirements, however, requires addition of the amount represented by operating capital. If the amount of farm expenses reported by farmers is taken as the measure of their operating capital requirements, total operating capital will be seen to have increased from \$128,052,210 in 1941 to \$366,262,000 in 1951. On a per farm basis the increase was from \$765 to \$2,433. Adding these figures to those for fixed capital given above shows that the combined or total capital requirements increased from \$7,880 to \$21,282.

<sup>19</sup> From 1951 census reports.

Increased operating capital requirements have been due mainly to two types of developments. Wholesale substitution of tractors and motor cars for horses and buggies has meant replacement of home-grown hay and oats by cash outlays for gas and oil as well as by large mechanical repair bills. In the second place, the increasing commercialization and specialization of agriculture has combined with technological advances to increase the number of cost items that must be purchased with cash. Besides outlays connected with operating and maintaining the new machinery, there have been extra cash costs because farmers have hired work done on a custom basis; because of the increased use of fertilizers and of spray materials for controlling weeds, insects, and other pests; and because of the tendency to use purchased rather than home-grown feed for dairy cattle, hogs and, particularly, poultry. The general result is that major cash outlays now account for well over 60% of all farm costs compared with less than 50% before 1939.

This development has had three significant effects. First, it has lessened the opportunity to reduce total cost per unit by operating at fuller capacity. In the second place, the fact that operating costs now make up a larger part of the total suggests that farmers will have less reason to maintain or expand production in the event of declining prices. Finally, since farmers now buy many more of the goods and services required for production, they have become increasingly vulnerable to the vagaries of price fluctuations. In addition to running the risk that prices of producers' goods and services may rise, they run the risk that these prices may not fall as far or as fast as the selling prices of farm products. Because of this situation the growth in the percentage of operating costs which are on a cash basis has contributed in no small measure to the recent farmer demand for price support assistance.

Finally, with regard to capitalization requirements, it may be noted that technological developments have been increasing the relative as well as the absolute importance of capital. As these developments have occurred, the importance of land and labour as production factors has declined, while the importance of capital and management has increased.

#### *10. Some General Changes in Ontario's Agriculture*

For many years past, and particularly in more recent years, there has been a tendency for livestock and livestock products to form an increasingly important part and grain production a relatively smaller part of total agricultural production. This change has been due partly to the fact that the province has proved more naturally suited for livestock than for grain production, partly to the comparative advantage of the Prairie Provinces as a grain producing area, and partly to a much more pronounced increase in the domestic demand for livestock and livestock products than for cereals.

While the relative importance of livestock and livestock products as a class has been increasing, the relative importance of specific products within the class has been undergoing some pronounced changes. Moreover, important changes have been occurring in connection with the kinds and sources of livestock feeds used. For example, apart from purely cyclical variations, the production of hogs and beef cattle has remained remarkably constant for many years whereas production of poultry meat and eggs has shown a steady and large-scale expansion. Again, the present century has witnessed a considerable shift from beef raising to dairy farming while a steadily larger part of the milk produced has gone to whole milk markets and a smaller part to cheese factories and creameries. While this has been happening, hay and pasture, and forage crops generally, have become a larger and grain a smaller part of total livestock feed. And, of the grain that is used, a significant part is now purchased rather than home-grown. While a considerable part of this purchased grain originates on Ontario farms, a sizable fraction of it comes from Western Canada. Another major change has been the steady increase in both absolute and relative importance of vegetables and small fruit production. Having indicated their general nature, we may examine a few of these changes in somewhat greater detail.

### *11. Cattle Production Trends*

In connection with livestock production the special situations relating to the several types of animals may be considered in turn. In the case of cattle it is particularly significant that total cattle numbers have tended to remain constant throughout the present century. This does not mean, however, that the cattle population of all parts of the province has continued at the same level. What has actually happened is that cattle numbers have shown an upward trend in about 8 of the 55 counties or districts, a downward trend in some 13 others and no appreciable change in either direction in all the remainder. Moreover, the increases in the 8 counties have been just about offset by the decreases in the 13 so that the number for the province as a whole has tended to remain unchanged. These results become apparent if the figures showing total cattle numbers by counties for the past 30 or more years are examined.<sup>20</sup>

Since it is particularly important for our present purpose to understand the forces or factors likely to change future cattle numbers, it seems desirable to try to account for the increases and decreases which have occurred in certain counties or districts in recent decades. When making such an analysis it soon becomes apparent that the increases have occurred in two kinds of area. The greater part of the increases has occurred in Bruce, Grey, Huron, Perth and Waterloo counties. These

<sup>20</sup> Figures obtained from annual reports of the Statistics Branch, Ontario Department of Agriculture.



counties, together with Lambton and the northern part of Middlesex, are inclined to be rugged and specially suited for grazing. They constitute what has long been referred to as the beef cattle area and, along with the more eastern counties of Peterborough, Lanark and Renfrew, account for a large part of all beef produced in the province. The increase in cattle numbers in the five first-mentioned counties above is due to an increased appreciation of the area's suitability for grazing, the impossibility of using the area for producing special cash crops, and an increased livestock carrying capacity resulting from higher grain and hay yields and improved pastures. The other and smaller part of the cattle increase has occurred in Manitoulin Island and in Thunder Bay and Timiskaming districts. Here the increase is due to the special fitness of the areas for pasturing, the stimulus provided by development of annual auction markets and the fact that these particular districts were, in considerable measure, being settled and developed during the period in question.

The decreases in cattle numbers are explained in two ways. In some cases the cattle enterprise has been reduced or eliminated to make way for others considered to be more profitable. In other cases cattle numbers have fallen simply because people have quit farming altogether. In Essex, Kent and Elgin counties the cattle population declined as production of vegetables and small fruits, and cash crops such as fall wheat, corn, sugar beets, soybeans and sunflowers was substituted for a type of mixed farming in which the cattle enterprise was basic. Fewer cattle were kept in Norfolk as mixed farming was replaced by specialized tobacco and fruit growing. In Leeds and Grenville a moderate but steady downward trend in cattle numbers occurred as the poultry enterprise was expanded and, more recently, as large areas of farmland were abandoned. In Welland fewer cattle were kept as part-time farming replaced the full-time sort. Since the start of World War II in particular, many people in this area, who formerly farmed on a full-time basis, have done little more than continue to occupy their farm homes while engaging full-time in non-agricultural work in nearby centres. Other areas in which cattle numbers have declined include Frontenac, Haliburton, Hastings, Lanark and Lennox and Addington counties and the districts of Muskoka and Parry Sound. In all of these there is a lot of land that has proved distinctly submarginal for agricultural purposes and has, consequently, been gradually abandoned. As these farms have been given up the cattle kept on them have naturally been disposed of.

Apart from actual numbers there is the important question of the kind of cattle or the purpose for which they are used. The important point here is that in Ontario cattle have been kept primarily for milk rather than meat production. Moreover, the emphasis on dairying has increased as ability to dispose of a larger percentage of the milk in the fluid markets has raised the average level of profitability of dairy farming. With dairying



being stressed, dairy rather than beef breeds have naturally predominated. This has meant that many steers and veal calves have come from dairy herds and that much of the beef has been processed from dairy bred cows of fairly mature years.

Most of the cattle in the so-called beef counties have been grade animals of the beef breeds. The average farmer in these counties has kept from 10 to 12 grade beef cows, an equal number of calves, yearlings and two-year-olds as well as some pigs and a small flock of hens. The normal practice has been to milk the cows, separate the milk, sell the cream to a local creamery, and feed the skim milk to the calves and pigs. Much of the revenue has come from the sale of cream and the two-year-old steers.

While this method of farming has spread the risk and provided fairly regular incomes, it has resulted in rather limited returns from the cattle enterprise. Returns have been limited because grade beef cows are low milk producers, because the creamery has been a relatively unremunerative dairy outlet, and because no returns could be obtained from the steers until they were sold at two and a half years of age. In view of this an increasing number of these farmers have been shifting in either of two directions. Where expanding liquid milk requirements has enabled them to secure whole milk contracts, they have shifted from beef to dairy bred cows and sought to have all but a small part of the income from the cattle enterprise come from the sale of liquid milk. Another group has been shifting to a more specialized type of beef production. Under this system the calves do the milking and the cattle are sold as baby beeves or fed yearlings. Because they are sold at one instead of two and a half years of age, the turnover is more rapid and the same feed supply will support twice as large a cow herd. The general result is that gross returns tend to approximate those obtainable from the sale of the cream and the two and a half year old steers. And, since the labour cost is greatly reduced, net returns tend to exceed considerably those obtained by following the traditional system. Moreover, the cattle are marketed at weights which are much more acceptable to the trade. Since under this plan all the feed is directed toward production of beef rather than a combination of beef and butter, a lot more beef can be produced from a given amount of feed.

Closely related to this specialized beef producing system are two or three other developments. One is the increased attention paid to improving pastures as more livestock farmers have realized that grass is their most valuable crop. Pasture improvement involves greater care in developing pasture seed mixtures, more regular reseeding, more attention to fertilization and better pasture management through such things as rotational grazing and regular clipping. Its general object is to ensure that the feed obtained from pastures is of high feeding value and that the

carrying capacity of a given area is substantially increased. The steady increase in the seeded pasture acreage, in the amount of artificial fertilizer applied to pasture land and in the number of county and province-wide pasture improvement competitions indicates that farmers and government officials alike are fully alive to the production potentialities of improved pasture programmes.

A second development is the rather sudden upsurge in interest in finding strains of animals capable of making rapid gains in weight and efficient use of feed. It is only logical that efforts to improve the quality and increase the quantity of feed should be accompanied by other efforts designed to obtain livestock which will yield the largest possible amount of meat or milk or eggs per unit of feed consumed. To the extent that more feed is obtained from each acre and more meat or milk from each pound of feed, the total amount of product secured from using a given amount of resources is increased.

A third kind of development has the effect of increasing the amount of resources available for production. The continued reduction of the horse population is leaving more land and feed for producing other kinds of livestock. In somewhat the same way the steady spread of the practice of artificial insemination is reducing the number of bulls that must be kept and fed and is thereby making feed available for other animals. It is now estimated that no less than 300,000 Ontario cows are bred annually by means of the artificial breeding technique.<sup>21</sup>

## *12. Sheep Production Trends*

Ontario's sheep population reached its highest level of slightly over two million in 1894 and 1895. From that time to the present there has been a pronounced downward trend, although its continuity has been interrupted for a few years at a time on two or three occasions. General indications are that numbers will continue to fall. By 1954 the sheep population was down to 410,000.

This drop in numbers cannot be accounted for on the basis of unsatisfactory mutton and wool prices or by any reduction in the desire of farmers to include a small sheep enterprise in their general farm business. The main reason for the decline has been an almost complete inability to cope with the dog menace and the attacks of other predatory animals. The losses caused by these other animals have often eliminated all possibility of profit or even resulted in serious net losses. A second reason lies in the fact that maintenance of sheep has often necessitated provision of more elaborate and expensive fences. Finally, it must be remembered that sheep are excellent converters of coarse roughages into

<sup>21</sup> Address entitled "Developments in Ontario Animal Production", by Prof. G. E. Raithby, at annual meeting of Meat Packers Council of Canada, Feb., 1956.

meat and wool but that, since they condense this feed so much, they do not have to be produced close to market. Because of this there is a tendency to produce sheep further from market and to stop producing them in the more settled areas.

While small farm flocks may continue to disappear, recent studies<sup>22</sup> suggest that a sheep enterprise can be quite profitable when the flock is large enough to warrant special attention and skilled management. Any expansion in sheep production is likely to be undertaken by farmers who are able to supply this specialized supervision and who can operate on a fairly large scale because they possess extensive areas of rough pasture land. It is doubtful, however, whether any expansion undertaken on this basis will more than offset the decline in the small farm flock.

### 13. *Hog Production Trends*

Ontario hog production rose steadily until about 1907 since when it has remained reasonably constant except for cyclical variations. The number of hogs on farms has varied from about one and a quarter to two and a quarter million. After being reached in 1905 and again in 1907, the two-million mark was not attained again until 1946. However, this figure has been reached or surpassed four times in the past decade. Moreover, except for the years 1953 and 1954, hog numbers have been significantly and consistently higher since 1939 than during the preceding decade.

While the provincial hog population has fluctuated considerably, the really significant changes have occurred on a county basis. To some extent the factors responsible for changes in cattle numbers have operated also in the case of hogs. In other cases, however, the fluctuations must be explained on somewhat different grounds.

In counties like Peel, Halton and Carleton, hog numbers have declined for various reasons. In all three counties total feed grain acreage has been falling since the early 1920's and quite pronouncedly in more recent years. This explains part of the drop in hog numbers since hog production in Ontario has been traditionally based on the idea that conversion of home-grown feed grains into livestock was the real backbone of sound mixed farming. This, in turn, relates to another part of the explanation of declining hog numbers, namely, the fact that on many farms in these particular counties the earlier mixed farming has been replaced by an increasingly specialized type. Nearness to urban markets has caused many farmers to become mainly concerned with production of milk for liquid consumption, poultry products, or fruits and vegetables. When farmers become whole milk producers they normally stress production of pasture

<sup>22</sup> See, for example, *The Sheep Enterprise on Ontario Farms*, by S. C. Hudson and J. G. Carson, Economics Division, Canada Department of Agriculture, 1952.



and forage rather than grain crops. Moreover, they are henceforth unable to rely upon skim milk or whey as feed for pigs. Finally, the transfer of significant areas of good farming land to industrial, residential and related uses during the past 15 years has meant a sizable reduction in the number of farmers who might have been raising hogs.

In several parts of the province hog numbers have fallen simply because farming activity has been replaced by other types of employment. Hog production has been reduced for this reason in Frontenac, Lanark, Lennox and Addington, and Welland counties and in the districts of Muskoka, Nipissing, Rainy River and Thunder Bay.

In a few counties the shift toward production of special crops which are sold for cash has reduced the amount of resources available for raising feed grains and for feeding such grains to hogs. It is primarily for this reason that fewer hogs have been produced in recent years in Elgin, Norfolk, Kent, Essex and (to a lesser extent) Lambton counties. Essex county had less than a quarter as many hogs in 1954 as 30 years earlier.

In several other counties hog numbers have fallen because a shift from creameries and cheese factories to condenseries and whole milk markets has deprived farmers of skim milk or whey and because poultry production has been expanded at the expense of the hog enterprise. Counties particularly affected in this way include Dundas, Stormont, Grenville and Leeds in eastern Ontario, Peterborough in the central part of the province and Lambton in western Ontario. During the past three or four decades poultry has assumed an increasingly important place in the farm economy and has become a serious competitor of hogs for the available feed grain supply. This situation, of course, applies in the whole country and not just in Ontario. The reason is that revolutionary technological developments have permitted the poultry industry to develop a degree of specialization and operating efficiency far beyond anything thus far achieved by the hog enterprise.

If fewer hogs have been kept in some parts of the province for the reasons just advanced, the numbers kept in other sections have shown marked increases. Indeed there are eight counties in which the hog population has increased until they now jointly account for almost half of all the hogs in the province. Thirty years ago they had less than 30% of the hogs. Moreover they had less than a third of the feed grain acreage in the 1920's compared with 40% by 1954. When yields are considered they produced 44½ % of the feed grain in 1954 compared with roughly a third of it in the earlier period. What these figures all mean is that both the ability to produce and the actual production of hogs have become more and more concentrated in these particular counties.

While farmers in these counties produce more hogs because they have more home-grown grain, at least two other factors contribute to their



relatively large-scale and specialized hog enterprises. Since, generally speaking, these counties are also the main butter-producing counties, the farmers who live in them have had more skim milk for their pigs than farmers located elsewhere. In the second place, since these counties are mostly situated close to Lake Huron and Georgian Bay, farmers living in them can obtain western Canadian feed grain on more favourable terms than other Ontario farmers. The cost of transporting grain by water from the head of the Great Lakes to the Bay ports on the Lake Huron and Georgian Bay coast line is much less than the cost of taking it to points further east by water or to any Ontario point by rail.<sup>23</sup> This means that farmers in the eight counties referred to, by supplementing home-grown feed with western grain when necessary, have been more able than other Ontario farmers to keep their supplies of hog feed and therefore their output of hogs from fluctuating.

Apart from all the foregoing, the actual number of pounds of pork produced has been affected considerably by various technological developments. These have included development of hogs with more hybrid vigour, greater capacity for rapid growth and more ability to transform feed into meat efficiently. They have also included advances in the fields of nutrition, in disease control, in the provision of improved buildings and equipment including the maintenance of electric heaters for winter use, and in hog management generally. These developments have resulted in larger litters, smaller pig losses and more litters per year. Some idea of their combined effect may be obtained by noting that between 1935-39 and 1952-55 the output of pork per hog on farms increased from 163 to 196 pounds or 20%.

#### *14. Poultry Production Developments*

Poultry numbers have risen from less than 10 million in 1900 to just under 25 million in 1954. Between 1943 and 1947, when large quantities of eggs were exported to the United Kingdom, the poultry population was considerably higher than this.

The record shows a wide variation in the rate of expansion as between the various sections of the province. While most areas have shared in the general expansion, there are a few in which the number of poultry has definitely declined. Significant drops have occurred in Essex, Kent, Hastings, Frontenac and Lanark counties and in the districts of Haliburton, Muskoka, Nipissing and Rainy River. In Essex and Kent poultry has apparently been reduced as more emphasis has been placed on special cash crops. In the other areas mentioned the reductions have tended to correspond with the reduction in the number of farms and farmers. As for the increases it is specially significant that the combined expansion in some

<sup>23</sup> See *Feed Grain Sources in Ontario* by H. L. Patterson and D. W. Hart, Farm Economics Branch, Ontario Department of Agriculture, January, 1954.

ten counties makes up more than half of the provincial total. In general the counties which produce the most poultry are the ones which produce the most hogs and beef cattle. And, as already indicated, they are the largest grain-producing counties. While there does appear to be a definite relationship between possession of home-grown grain and willingness to expand poultry numbers, there are several cases where the advantage of being located close to large urban markets has been sufficient to outweigh the disadvantage of having to rely on purchased feed. Striking examples are found in the case of Halton, Peel, Wentworth and Lincoln counties.

Considering the province as a whole there is no direct or close relation between the scale of home-grown grain and poultry production. The fact is that a significant part of the expansion in poultry production has been based on the use of grain grown in western Canada rather than in Ontario. It has recently been estimated that approximately half of all western grain brought into Ontario in recent years has been used for poultry production.

Present-day Canadian poultry production is far more dependent on purchased feed than any other type of livestock production. In 1948 the production of commercial poultry feeds in Canada amounted to 653,000 tons whereas the production of commercial hog feeds was only 333,000 tons. And this despite the fact that the total amount of feed consumed by hogs was 50% more than what was consumed by the poultry.<sup>24</sup> Indeed the major development of poultry keeping on Canadian farms did not really begin until large-scale feed manufacturing developed. Canadian feed manufacturers entered the picture as an important factor in the late 1920's. Prior to that specialized poultry production was restricted to a relatively small number of straight poultry farms. Small flocks were kept on ordinary farms but only as a pure sideline. Even on so-called specialized poultry farms relatively few eggs were laid in the fall and winter months, and the feed used was ordinarily mixed by the poultrymen themselves. At that time the use of vitamin D supplement had not become general and many of the nutritional secrets which have since found commonplace application in standard poultry rations were just beginning to be discovered.

By the late 1920's, however, knowledge of poultry nutrition requirements was really growing and poultry farming was coming to be looked upon as a worthwhile undertaking. The profit-making possibilities of fall and winter egg production were being recognized and the industry in general was looking ahead with confidence. It was in these circumstances that trained agriculturists with special knowledge of poultry nutrition and management were employed by milling and feed manufacturing concerns to help meet the growing demand for poultry feeds. From that time to

<sup>24</sup> From a 1951 address by S. C. Barry, Chief of the Livestock and Poultry Marketing Service, Canada Department of Agriculture.

the present commercially prepared feeds have constituted a steadily increasing proportion of all feed requirements of Canadian poultry producers.

### *15. Dairy Farming Trends*

While total cattle numbers have remained relatively constant, there has been a definite long-time upward trend in the number of milk cows. Census data show that cow numbers increased gradually from 638,800 in 1871 to 1,236,841 in 1951. A comparison of this increase with the increase in total milk production shows that the increase in milk production per cow has also been extremely gradual. The most pronounced changes have occurred in the purposes for which the milk has been used. A steadily increasing percentage of the milk has been disposed of in the fluid market or used for making concentrated milk products and ice cream while a steadily smaller percentage has been used for making butter and cheese and for consumption by the farm people themselves. Milk has been shifted from the relatively unremunerative butter and cheese outlets to the relatively more remunerative concentrated milk and still more remunerative fluid milk outlets. As for the reduced consumption in farm homes this has been caused by a roughly comparable reduction in the farm population.

The fact that milk production per capita was almost 50% greater in the 1935-39 period than in 1954 shows that total milk production has not increased nearly as fast as the province's population. Since this has been so and since total milk requirements per capita have expanded considerably during the interval, it follows that the rapidly expanding dairy product needs of the province could only be met by drawing on some previously unused source of supply. In practice the gap has been filled by reducing exports and by substituting margarine for butter consumption.

Dairy farming has tended to become more specialized and especially among farmers who are producing for the fluid milk market. The specialization has taken various forms. The cattle selected have tended to be from one or other of the special dairy breeds. In fact there has been a rather pronounced tendency to concentrate on Holsteins which are noted for the quantity rather than the high butterfat content of the milk they produce and for their special ability to make effective use of the kind of roughage grown on Ontario farms. Replacement of grade cows with purebreds has also been a marked tendency during the past quarter century. Breed association records show that the number of Ontario cattle registered rose from 46,539 in 1930 to 91,559 in 1955. All but 2,753 of the additional registrations were accounted for by the Holsteins. The more specialized dairymen have also followed a continuous culling programme. Special care has been taken to determine the quantity and quality of milk produced by each animal together with the degree of efficiency in transforming feed into milk. Concurrent with these developments have been others designed to improve the quality of feeds and feeding methods. More



attention has been paid to improving the quality and increasing the carrying capacity of pastures. Special attention has been given to harvesting hay so as to preserve its protein content and thereby improve its feeding value. Interest in improved feeding methods and in the possibilities of using more high-grade roughages has been increasing. All of these developments have helped to increase milk production per cow. For example, studies made in the same area and including many of the same specialized dairy farms in Oxford county showed that the average production per cow had risen from 6,650 pounds in 1924 to 8,580 pounds in 1954.<sup>25</sup> These figures show how production might be increased if methods already being followed by the more specialized producers could be applied generally.

To the extent that more and better feed has been produced in the same area, the way has been paved for an expansion in the average size of a dairy herd. And to the extent that it has been possible to combine the additional quantity of higher quality feed with cows capable of producing more milk from a given amount of this feed, the possibilities of increasing the quantity of milk produced per herd and per farm have been enhanced. When more and higher producing cows and more and better feed are combined, increased output of milk is inevitable. It has thus been possible to supply a considerable part of the extra milk needed in the fluid market without increasing the number of fluid milk shippers. That it has not been possible to obtain all the additional requirements in this way, however, is clearly indicated by the steady expansion in the number of shippers and the area from which fluid milk has come.

The gradual installation of bulk cooling tanks on the farms and the combining of these with the bulk hauling of milk in tank trucks may significantly affect the number and size of fluid milk shippers. While only about 300 Ontario producers had installed refrigerated bulk storage tanks by the summer of 1955, the number has undoubtedly increased considerably since that time.<sup>26</sup> Moreover, present indications are that milk distributors will eventually refuse to accept milk from farmers who have not adopted the new handling and cooling technique. In that event many farmers who are now producing on a relatively small-scale basis will probably be eliminated from the list of shippers. It seems generally agreed that only relatively large-scale producers can justify the expense of installing the refrigerated bulk cooling tank and related equipment.

### *III. The Future Prospects*

The foregoing consideration of past and current developments has been undertaken in the hope of providing a reasonably reliable basis for arriving

<sup>25</sup> "Prospective Livestock Production Trends in Ontario", by H. L. Patterson, address given at annual meeting of Industrial and Development Council of Canadian Meat Packers, Jan., 1955.

<sup>26</sup> Circular 267, November, 1955, by Department of Agricultural Economics, Ontario Agricultural College.



at conclusions regarding the future course of events. While it is obviously impossible to foresee the many and varied changes that are certain to take place, it would be very unusual indeed if future developments were not influenced to a considerable degree by those which preceded them. In some cases, at least, projection of past and present trends seems likely to give a fair indication of what may be expected later on.

### 1. *The Land Supply Prospects*

In attempting to estimate the future land supply in the light of past and present trends, one is led to conclude that most of the land which is suitable for farming is already improved and under cultivation; that the high cost of clearing and otherwise improving land under present conditions will prevent land improvement except in very limited areas where land values are particularly high and where any land added could be made to yield an especially high per acre income; that considerable areas of the most fertile, most agriculturally developed and best located farm land in Ontario will be transferred to industrial, residential and highway and airport construction uses; that the total extent of such transference is likely to exceed the amount of presently occupied land that is likely to be improved and thus placed in the productive category; that most, if not all, of the specialized fruit-growing land in the Niagara Peninsula and adjacent to Lake Ontario will have been shifted to non-agricultural uses within the next quarter century and despite any special efforts that may be made to prevent this from happening; and that the opportunity to obtain more remuneration from industrial employment than from farming in the more marginal areas will continue with the result that the area of abandoned land in these districts will increase. Since, however, most of the areas distinctly unsuited for farming have probably been abandoned already, future acreage reductions will likely take place at a more moderate rate than in the recent past.

When one considers the combined effect of the foregoing conclusions, the inevitability of a significant net reduction in the improved land acreage becomes apparent. Since the net reduction between 1941 and 1951 was almost 700,000 acres and since reduction has proceeded at an accelerated rate since 1951, the next 25 years will likely see a further reduction of 700,000 acres. This suggests that the amount of improved farmland will be not more than 12 million acres by 1980.

### 2. *The Type of Farming or Land Use Prospects*

In considering how this land is likely to be used one may begin by assuming that it will be used to whatever extent is necessary to produce those commodities which must be produced relatively close to the point of consumption. And since such a large part of the nation's consuming popu-

lation seems likely to be located in Ontario, a large percentage of the perishable and less-transportable farm products will have to be produced in that province. Such products include milk used for liquid consumption, eggs and (to a lesser extent) poultry meat and fruit and vegetables.

Apart from this necessity of producing perishable and bulky commodities, most Ontario farmers will find it economically desirable to concentrate on producing forage crops rather than cereals. Between 1911 and 1954 the percentage of improved land in feed grains and fall wheat declined from 40% to 35% while the percentage devoted to hay, pasture and fodder corn rose from 54% to 59%.<sup>27</sup> Since the percentage in pasture, hay and other fodder crops has been so large for so long and since it has been increasing, one may expect that the percentage so used will be not only maintained but gradually increased in future decades.

The relatively limited districts known as the special cash crop areas will probably continue to emphasize this type of farming. Farmers in these areas have natural monopoly advantages in the production of crops for which the future market seems likely to be at least as remunerative as that of the past. Because of this, cash crop farming is almost certain to take precedence over other types in these areas.

One may be fairly certain also that the relatively limited areas specially fitted by virtue of soil and climate for producing tobacco and potatoes will continue to be used for these purposes. In these cases, however, market demand is likely to be much more limited than the supply of the particular kind of land required.

### 3. *The Probable Size and Number of Farms*

Most, if not all, of the factors responsible for increasing the size and reducing the number of farms in the recent past will continue to exert an influence in the years ahead. The further reduction in the total land area suggested above will inevitably cause a decline in the number of farms. Moreover, much of the land going out of agriculture will be land which is now organized in relatively small farm units. Many of the specialized fruit and vegetable farms that are destined to disappear, for example, are quite small when measured on an acreage basis. And, in many cases, the purely voluntary type of land abandonment will be due to the fact that farms were too small to permit efficient use of modern equipment and labour and to return an adequate income. Many farmers, however, will be able to continue operating their small acreage farms either because a considerable part of their income is obtained from non-farm sources or because of their ability to substitute the hiring of custom operators for the purchase and maintenance of expensive equipment. Present indications point to a continued

<sup>27</sup> Chart supplied by Farm Economics Branch, Ontario Department of Agriculture, November, 1955.

expansion of part-time farming. Its further development may be facilitated considerably by implementation of the industrial decentralization policy presently sponsored by the Ontario government. The Eastern Ontario Development Association, for example, by establishing new industries in eastern Ontario towns, will help to provide nearby farmers with industrial job opportunities.

In the future as in the past farmers who find it technically desirable and financially possible to enlarge their farms will purchase the smaller farms of those who decide to give up farming. Continuation of this process will result in a relatively large number of small farms being replaced by a much smaller number of large farms. The incentive to enlarge farm acreage will vary with the type of farming engaged in and the extent to which the traditional mixed brand of farming is replaced by a more specialized type. Fruit and vegetable farmers and poultry producers will continue operating on a relatively small acreage. Those wishing to specialize in beef production, on the other hand, will probably find it necessary to expand their acreage. Offsetting the inclination to increase acreage, however, will be a tendency to cultivate the existing acreage more intensively. In practice farmers will be forced to compare the cost of acquiring additional land with the cost of making more intensive use of their existing land.

There seems little doubt that the forces making for enlargement of farms will easily outweigh those tending to maintain the status quo. In our opinion the general trend toward fewer and larger farms will continue but not at a greatly accelerated pace. We also believe that the reduction in the number of farms will be proportionately somewhat greater than the expansion in the size of those which remain. This conclusion is based on the fact that the number of farms will be reduced because land transferred to non-agricultural uses cannot contribute to enlargement of other farms, and because some of the smaller and more marginal farms that are most likely to be vacated will not be located where the larger, more efficient and financially stronger operators can make use of them.

#### *4. The Probable Farm Business Organizational Set-Up*

In our view the individually owned and operated family farm will continue to be the characteristic form of business organization. At the same time we shall probably witness further examples of farms owned and operated on the partnership, co-operative and corporation basis. And it is even more certain that the number of father-and-son business agreements will be greatly increased. Moreover, a greatly increased need for borrowed capital and a steady growth in the scientific character of farming will probably result in an increasing number of farmers seeking or being forced to accept supervisory assistance from specialized farm managers.



### 5. *Probable Developments in Farming Methods*

The recent tendency to substitute machines for men will certainly continue. The actual rate of mechanization will depend on the relative costs of the hand and mechanized methods, the rate at which farms become large enough to justify investment in machines, the rate at which existing machines can be improved upon and still further tasks satisfactorily mechanized, and on the degree of profitability of farming. Little further substitution of tractor for horse power will occur, since tractors are already almost as numerous as farms and horse numbers were almost down to one per farm as long ago as 1951. Similarly, one may predict that the supplying of farms with electric power will have been completed for all practical purposes within a very few years. The process of making fuller use of this power, however, will continue for very much longer as only a minority of farms approach being fully supplied with electrical equipment at present.

Mechanization will be speeded up by the development of new types of machines and improving existing types. The over-all trend will be toward reducing the number of separate machines needed to operate the several types of farms. The reduction will be achieved by producing more general purpose equipment with inter-changeable units to suit a variety of jobs and by reducing the number of separate field operations by integrating two or more machines which operate at the same time. Mechanical developments currently being planned include a machine which will complete the necessary tillage, placing of the fertilizer and laying of the seed all in one operation; improvements in seeding equipment which will plant and hold each seed in a specific place, thus reducing the amount of seed required; machines which will raise yields by placing fertilizer in bands near the seed rather than broadcasting it; haying machines which will reduce leaf loss by reducing actual handling of the crop and speeding up the field curing; smaller one-man forage harvesters which will facilitate mechanization of silage making, haymaking and swath threshing of grain crops on small farms; improvements in corn pickers aimed at reducing ear and shelled corn loss; machinery which will permit earlier harvesting of corn by artificially drying shelled corn after harvesting; shredders or choppers to be attached to corn pickers to shred or chop and load or spread what is left of the crop after the ears have been picked; and tractors which will gain in horsepower as fuel refinements cause increased compression ratios.<sup>23</sup>

While these innovations are obviously not going to occur all at once or right away, it is safe to predict that their actual appearance will not be long delayed and that they will be in general use long before 1980. Moreover, the future is certain to see more widespread use of many machines which have only recently become available.

<sup>23</sup> "Developments in Soil and Crop Handling Equipment", Prof. C.G.E. Downing, in *Addresses and Proceedings 1955 Convention*, Ontario Soil and Crop Improvement Association, published by Ontario Department of Agriculture.



The same general factors which will further the mechanization trend will cause an intensified effort to reduce labour and capital costs by changing the style and location of buildings, altering the shape and size of fields, introducing new feeding and cleaning methods, etc. Since improvement potentialities in this sphere have been little more than tapped in most cases, the next two or three decades are bound to witness really extensive changes, particularly in the case of farm buildings.

For the reasons already given we anticipate that the trend toward a more specialized and commercialized type of farming will continue. Future farmers will buy far more food and feed than the more generalized farmers of the present. Moreover, the specialized farming of the future will mean more complete specialization on a regional and functional as well as on a type-of-farming basis.

The already noted trend toward more intensive farming will not only continue but become more pronounced as time passes. Greater intensification seems inevitable in view of the increasing scarcity and rising value of land which is certain to accompany the general economic expansion and growth of population. More artificial fertilizer will be applied as more knowledge is gained regarding the potential benefits of using fertilizer, the particular fertilizer requirements of the different crops and kinds of soils and as more efficient methods of applying the fertilizer and combining it with the seed and soil are found. More fertilizer will be used in areas where applications are already large because the high-priced crops grown there provide special economic justification and because farmers in these areas have learned that large amounts of fertilizer can be used to advantage. However, it is in the rest of the province and in connection with attempts to increase the yield and improve the quality of the hay and pasture crops that the main expansion in fertilizer usage is likely to occur. Farmers who have already used fertilizer on hay and pasture land will apply larger doses while the majority who have not yet applied any will gradually learn that it is competitively necessary and economically wise to do so. From experience to date it would seem that most farmers in this category could apply quite large amounts before encountering the stage of diminishing economic return. In view of the foregoing and considering the rate of expansion in recent years, fertilizer sales may be expected to double and possibly treble between now and 1980.

As for irrigation most developments will be in areas where the crops grown yield specially high returns per acre. Recent developments make it fairly obvious that expansion will take place in a large part of Essex and Kent counties, in the tobacco-growing districts and in other relatively limited areas where small fruits and vegetables are produced. In all such districts the rate of expansion will largely depend upon the ability to secure the necessary water supplies. Some use may be made of irrigation in specialized fluid milk producing districts and especially on farms where near-

ness to large urban centres makes for particularly high land values. It is unlikely that much use will be made of irrigation in connection with beef raising partly because of the extensive nature of the enterprise and partly because the major beef areas are normally pretty well supplied with rainfall during the grazing season. However, some use will probably be made of irrigation in sections where land values are unusually high and where beef raising is combined with production of cash crops. In such cases facilities which are primarily intended for irrigating cash crops may be used more or less incidentally for watering hay and pasture land.

Other forms in which the trend toward intensification will show itself will include more complete attempts to control weeds by using chemicals, more thorough attempts to minimize losses due to insects and fungus diseases, more efforts to increase yields and the cultivated acreage by undertaking more and better drainage, more thorough cultivation, greater care in the selection of livestock feeds and feeding methods, etc.

#### 6. *The Prospective Labour Productivity*

To the extent that more fertilizer, more irrigation facilities, more chemical weed killer, better seed, more buildings designed to save labour, larger and better shaped fields, higher producing strains of livestock, and more and better machines are combined with a given amount of human labour, the amount of product turned out per unit of labour is certain to increase. And since the future is likely to see pronounced additional use of all the non-human factors mentioned as well as others, their use is destined to raise labour productivity considerably. The gradual increase in farm size and the gradual adoption of more specialized farming and farming methods will further increase productivity per man. The same end will be served to the extent that labour finds it unnecessary to continue working on the more marginal or less productive land.

Offsetting these factors will be others which will tend to reduce labour productivity. In certain cases the land used will be less rather than more productive than before. If vegetable and fruit growers who have operated in areas adjacent to the Lake Ontario shore line, for example, undertake these types of farming in less favourable locations as some are now doing, they may well get less product per unit of labour than they have been accustomed to. A more important factor, however, will be the shift from less labour-consuming to more labour-consuming types of farming. As time passes a larger percentage of the labour force will be engaged in such enterprises as fruit and vegetable and fluid milk production which require relatively large amounts of labour. It must also be remembered that the process of eliminating the less efficient farmers and less suitable farms is likely to operate much more slowly in the future than in the past.

If one seeks for the combined effect of these opposing sets of influences, it would seem that the prospective technological developments will out-

weigh considerably the productivity-reducing effect of engaging in more labour-consuming types of farming. Even though types of farming such as vegetable growing become relatively more important, they will not become of overriding importance. Moreover, technical improvements in vegetable production will decrease labour requirements almost as much as the growing relative importance of this type of farming will increase them. On balance, therefore, our belief is that farm labour productivity will continue to rise throughout the next 25 years but that the rise will be more pronounced in the first than in the second half of this period. Between 1940 and 1954 labour productivity in Ontario rose by 75%. In the light of this experience and considering the probable influence of the factors outlined above, we conclude that it could rise by as much as 50% above its present level before 1980.

### 7. *Future Capital Requirements*

Future total capital requirements per farm will expand as farm operating units increase in size. Apart from this, however, there will be some significant changes in the kinds of capital required and in the amount required for specific purposes. Since the capital presently needed for machinery and buildings is extremely large both in absolute amount and as a percentage of total capital requirements, special efforts will certainly be made to reduce these particular capital outlays. Indeed such efforts are already being made. It is at least conceivable that significant progress will be made in building multipurpose machines and thereby reducing the total number of machines needed. Moreover, insofar as generalized farming is replaced by a more specialized type, the number and variety of machines on the average farm may be somewhat reduced. Recent developments also give promise of substantial reductions in the amount of capital needed for farm buildings. It would appear that savings will result because less space will be needed to hold a given amount of livestock feed and because less elaborate quarters will be used to house the livestock.

Despite reductions of the type just indicated, future capital requirements must be expected to increase. The outlay for the land factor is certain to rise and probably significantly as land becomes more scarce and high priced. Moreover, the trend toward increasing mechanization, intensification and commercialization of farming suggests an increase in the number of fixed investments and in the number of requirements for operating capital. In our view, however, the increase in capital requirements will be minimized considerably by the above-mentioned attempts at reducing building and machinery costs.

### 8. *The Probable Production Results*

#### (a) *Grain production*

The grain acreage will keep on falling, partly because of a growing preference for forage crops, partly because land now used for producing



grain will be shifted to the growing of special cash crops, partly because a small amount of additional land will be needed for fruit and vegetable production, and partly also because of a sizable reduction in the total amount of improved land in farms. While the decline will be gradual it is unlikely that more than three million acres will be used for growing feed grains and fall wheat 25 years hence.

As for yields our opinion is that, despite the fairly significant yield increases of recent years, there is still plenty of room for improvement. We also anticipate continued substitution of corn for other kinds of grain and a consequent increase in the average yield of grains as a class.

Changes in acreage, in kinds of grain grown and in yields have combined to increase total annual grain production (excluding flax and beans) from 158,851,600 bushels during the 1935-39 period to 176,920,000 bushels in 1950-53. While this result might suggest that future grain supplies will increase despite acreage declines, we do not expect that this will happen. Our feeling is that it will prove increasingly difficult to increase yields as time passes and that the effects of reduced acreage and yield expansion will be just about offsetting. This would mean that total annual grain production would continue to be about 177 million bushels during the next quarter century.

#### *(b) Special cash crop production*

From recent experience and current indications it seems that the special crop most likely to expand is soybeans. In this case a limited amount of production has taken place in many parts of the province. In spite of this, however, 94% of all soybean acreage in 1954 was in five southwestern counties. On the basis of what has happened to date our conclusion is that the special crops will probably be produced in somewhat larger quantities but in relatively limited areas. Recent additions to the group, such as sun-flowers which are currently being used for bird seed, will not require much expansion to meet the needs of that very limited market. As for sugar beets the record suggests that acreage will continue around the 32,000 figure which has remained fairly constant for many years.

#### *(c) Tobacco production*

The extent of future tobacco production will depend mainly on the extent of the market both at home and abroad. Acreage expansion potentialities are relatively unlimited while expansion of irrigation and other technical developments including development of higher yielding varieties are likely to ensure considerably higher average yields. Whereas flue-cured tobacco production was formerly confined to Norfolk and one or two neighbouring counties, it has recently been spreading to sections of Simcoe, Bruce and Durham counties with apparently quite satisfactory yield and quality results. Some idea of the expansion possibilities may be obtained by noting that tobacco acreage rose from 63,340 acres in 1943 to 120,804



acres in 1954 while the corresponding change in production was from 62.3 million to 175.5 million pounds.

*(d) Potato and root crop production*

Ontario potato production has dropped to little more than half of what it was 30 or 40 years ago, while potato acreage has declined to just about a third. The drop in acreage has been compensated in considerable degree by a higher yield, particularly in more recent years. Between 1935-39 and 1950-53, for example, potato acreage declined 74,850 acres or 51%, whereas the decline in production was only 354,800 bushels or 2.5%. While the decline in potato consumption per capita will continue, it will not be sufficient to offset the growth in population. Total Ontario consumption will probably be about a quarter larger in 1980 than it is now. The fact that commercial production has recently been getting more specialized and that increased yields have been helping to reduce costs suggests that future competition with the Maritimes may be a lot more effective than that of the past and that some increase in Ontario's production may occur.

Between 1935-39 and 1950-53 Ontario's production of root crops fell 75%, owing mainly to the growing scarcity and increased cost of labour. Since this factor seems likely to continue operating, root acreage will certainly keep on falling. Indeed it may virtually disappear within a very few years.

*(e) Fruit and vegetable production*

Apart from tree fruits other than apples and the fruits and vegetables which have to be imported, there will be no difficulty at all in producing whatever fruit and vegetable supplies may be required. There is room for large-scale expansion in the reclamation and use of vegetable growing land in the Holland Marsh area north of Toronto. And about 40 miles east of Ottawa there are reputed to be many thousands of acres which, when drained and otherwise reclaimed, will be ideal for specialized vegetable production. Any additional apple orchard land required can be found in various counties such as Norfolk, Brant, Oxford and Elgin and particularly in the Collingwood area adjacent to Georgian Bay.

The only problem that may occur is in connection with tree fruits other than apples. There is every likelihood that most of the territory located in the Niagara Peninsula and between Toronto and Hamilton presently being used for producing these fruits will be gradually taken over for industrial and residential purposes. While there are other sections of the province where these fruits could be produced fairly successfully, there do not appear to be any other areas which are nearly as suitable as those now being used. The very fact, however, that some farmers who have recently sold their fruit land adjacent to the Lake Ontario shore

line have already begun the same type of farming somewhat further removed from the lake indicates that it may still be possible to produce even these particular fruits with sufficient efficiency and in sufficient amounts.

*(f) Beef production*

There are several factors that are likely to increase beef production and several others that will tend to reduce it. It should be possible to produce a lot more beef on the same area as the aforementioned increases in yield and improvements in quality of the various cattle feeds take place. From experience to date it would not be surprising if development and spread of the various feed improvement programmes make it possible to carry twice as many beef animals per unit of area on the average beef farm by 1980. Similarly technical advances relative to the growing qualities and feeding efficiency of cattle will make it possible to produce considerably more beef from a given amount of feed. Developments along this line should make real headway during the next quarter century. Then again the gradual spread of artificial insemination will improve the average strain of animal and help reduce production cost, and by enabling feed which would otherwise go to large numbers of bulls to be fed to other cattle it will contribute directly to the beef supply. Moreover, expanded dairy farming cannot occur without incidentally causing some increase in beef production. The male dairy calves at least as well as the cows that have completed their milking lives will form part of the total beef supply. Again, districts like Kent county which have always combined large beef enterprises with cash cropping programmes will continue to do so because it makes for more efficient use of labour and provides the most satisfactory way to maintain soil fertility and make effective use of cash crop residues. Development of a more specialized type of beef production will also tend to increase output, partly because the more specialized methods will be more productive methods and partly because feed and other resources will normally be directed toward producing beef rather than a combination of beef and butter. Some expansion of this more specialized production may be expected. Production of beef will also expand because farmers who cannot afford or obtain the labour needed for other types of farming, who are older and less able to work than formerly and who are financially able to accept the relatively lower income which beef raising provides will tend to place greater emphasis on it if, indeed, they do not concentrate on it entirely. Finally, more part-time farmers and people living on farms while working mainly at non-farm pursuits will probably aim to secure part of their income by maintaining beef herds.

Of the production-limiting factors perhaps the most important is found in the fact that beef raising is a pretty extensive type of farming. Since a given size of farm will ordinarily yield only about half as much

income when used for beef raising as when used for dairy farming,<sup>29</sup> a farmer on an average sized farm who finds it impossible for technical or financial reasons to enlarge it will normally decide to continue in dairying. Moreover, as the general economic expansion exerts increasing pressure on the limited total land supply, more and more land will have to be shifted from the extensive beef raising to enterprises of a more intensive character. Thus it will become more difficult to stay in beef raising as well as to get into it. Beef production will also be limited because the amount of land that is specially suited for grazing is definitely limited. Apart from that found in the counties adjacent to Lake Huron and Georgian Bay and two or three counties in the eastern part of the province, the only natural pasture land is in some of the more northern districts. And while it is possible that these latter areas can gradually be used to raise feeder cattle for purchase by farmers in the southern part of the province, it must be recognized that these northern sections have some special limitations. Of these lack of sufficient capital to engage in extensive cattle raising, relatively short pasture seasons and a long and expensive indoor feeding season are probably the most important. Finally, one must remember that the future will see further reductions in the amount of land being farmed and disposal of cattle as farms are vacated or sold.

A general weighing of these two sets of opposing factors suggests that, for the next five or ten years at least, Ontario's beef production will show a definite increase. During that period the need for extra land for more intensive types of farming including fluid milk production will not be sufficient to cause any significant shift from beef raising. In the longer run, however, the amount of shifting required will increase with the result that it will be more difficult to expand and possibly even maintain beef production. We therefore predict that total beef production 10 years hence will be about 10% or possibly 15% above the present output and that it will remain fairly constant for several years after that.

#### *(g) Pork production*

Several factors will tend to encourage pork production. The probability that home-grown feed grain supplies will be at least prevented from falling will tend to provide the kind of production base on which Ontario's hog production has heretofore depended. Continuance of the current feed grain assistance policy, if this may be assumed, will certainly permit a considerable amount of hog production that could not possibly be undertaken without freight assistance. Moreover, this will be particularly true for those counties which have been responsible for a major part of the total provincial hog production in recent years. It may also be mentioned

<sup>29</sup> This has been shown very clearly in studies made recently in Ontario by the Farm Economics Branch, Ontario Department of Agriculture.



that protein supplements are becoming steadily more important in hog rations and that soybeans, one of the most important contributors to these supplements, are being grown in Ontario in rapidly increasing quantities. Then again we may expect further improvements in both feeding rations and feeding methods; this will have the general effect of increasing the amount of pork obtained from a given amount of feed. Finally, increasing specialization in hog production will raise the general level of productive efficiency by causing more attention to be paid to breeding, feeding and general managerial efficiency. Hereditary defects of economic significance will be weeded out and care will be taken to prevent new ones from entering the breeding population. As a result sows will have larger litters and the death rate of new-born pigs, which is now 20% to 25%, will be reduced. Similarly more progress will be made in developing strains of hogs with more hybrid vigour, with more capacity for rapid growth and with greater ability to make efficient use of feed. All of this will make for lower costs and, consequently, tend to encourage production.

Among other factors likely to limit production it may be noted that home-grown grain supplies will not be sufficient to permit any really worthwhile expansion in hog numbers. Moreover, it is probable that a steadily larger part of whatever Ontario-grown grain exists will be used for poultry rather than hog feed. Since poultry and, particularly, eggs are much more perishable and less transportable than pork products, it will be more necessary to produce the additional requirements of eggs and poultry in Ontario than to produce the pork there. Closely related to this is the further probability that poultry production will continue to be substituted for the hog enterprise on many of the more mixed farms. Even more important is the prospect that, as mixed farming is replaced by a more specialized type, the number of farmers who are able to fit a hog enterprise into a mixed farm programme will diminish. As farmers become specialized whole milk producers, for example, they will find it more impossible or undesirable to keep on raising hogs. This last point is related to a further one, namely, that the prospective gradual shift from producing for creameries and cheese factories to producing for fluid and concentrated milk markets will leave more farmers without the skim milk and whey which has been traditionally relied upon by Ontario hog producers. Finally, it must not be forgotten that quite a number of those raising hogs will shift from farming to other types of activity as the years pass.

While it is difficult to appraise the relative importance of each of the factors mentioned above and even more difficult to estimate their combined effect, our conclusion is that Ontario hog production will be not only maintained but to some extent increased during the next quarter century. This conclusion is based partly on the knowledge that it is much



easier to fit a hog enterprise into an average farmer's production programme than a beef enterprise. Hogs can be brought to the marketing stage in a far shorter time and with a far smaller capital outlay than beef cattle.

But while some further expansion in hog production is anticipated, we expect that it will be both gradual and moderate. On the basis of past performance and considering the various factors just indicated, we would doubt whether production will expand by more than 10% or 15% in the period here being considered.

#### *(h) Poultry and egg production*

Unlike several other farm enterprises poultry and egg production is not likely to be restricted by such things as scarcity of land, lack of home-grown feed, unsuitable soil or climate or unprogressive and inefficient operators. On the other hand there are several factors which will tend to expand production. The fact that poultry raising has shown itself capable of achieving an increasingly important place in a mixed farming programme indicates that it possesses advantages which are likely to receive special producer consideration in future. More important, however, is the fact that commercial poultry keeping is likely to become increasingly organized on a large-scale and highly specialized basis. The more this type of development occurs the more rapid will be the advancement in such things as egg production per hen, egg and meat production per unit of feed, higher hatchability rates and lower mortality rates, higher labour productivity rates and lower capital costs per unit of output. Improvements along these lines are likely to develop and spread rapidly in Ontario because of the existence of a particularly well-integrated research and extension programme. The close and effective working relationship that has come to exist between the specialized hatcheries, the producers' organizations, the feed companies and the government research and extension workers is bound to make for rapid development and spreading of new ideas.

When one adds to the foregoing the fact that poultry farming is easier to get into and permits a more rapid turnover than other livestock enterprises, that it has already been substituted for hog raising on many mixed farms and that Ontario poultry producers have already (in wartime) demonstrated their ability to greatly expand production, one cannot but conclude that any desired expansion of poultry and egg production will be achieved without difficulty.

#### *(i) Milk production*

There is little doubt that the methods which have already produced greatly increased yields of hay and pasture on a limited number of farms will be used by many more farmers in the fairly near future. The same

may be said of the methods used to obtain the maximum feeding value from the hay and other forage crops. Production of more and better feed per acre will increase the cow-carrying capacity of the farms. Concurrent with these developments will be others which will result in strains of animals capable of giving more milk per cow and per unit of feed. These higher producing cows will be the result of more scientific breeding and more careful culling. Part of this improvement will come as more widespread use of artificial insemination enables more farmers to obtain the benefits that accrue from using bulls of proven milk-producing ancestry.

Then again, as population increases, a larger part of all milk produced will go to the fluid milk market.<sup>30</sup> Some farmers who now produce butterfat for the creameries along with beef and hogs will become specialized whole milk shippers. When this happens they will ordinarily shift from cows of beef or dual-purpose type to a dairy breed which gives more milk. Moreover, production of more of the milk by whole milk shippers will ensure that more of it will be produced under at least semi-specialized conditions. This, in turn, means that more milk will result from a given amount of production resources.

On the other hand expansion of milk production will be subject to some limiting factors. There will, for example, be a considerable reduction in the amount of land on which feed can be grown and cows kept. Moreover many of the farms that will be transferred to industrial and residential uses are now among the largest and most specialized fluid milk producing farms. It is also probable that significant number of farmers who are now supplying one or other of the several dairy outlets will shift to a type of beef farming in which the calves obtain all the milk directly from their mothers. Then again we may be sure that, despite all improvements effected by breeding, feeding and culling techniques, there will still be many low-producing cows on Ontario farms in 1980. In this connection it is well to remember that the long-run expansion of milk production in Ontario as in Canada generally has been extremely gradual. The increase in the total milk production of the province between 1935 and 1954 was only 3.8%.<sup>31</sup>

Our general conclusion, after weighing the several factors mentioned above, is that milk production will increase somewhat more rapidly in the future than in the past. At the same time we would expect that the rate of expansion will be more rapid in the first than in the second half of the next quarter century. Over the whole of that period it seems unlikely that production will increase more than 15 or 20%.

<sup>30</sup> *Agricultural Statistics for Ontario, 1954.*

<sup>31</sup> The percentage going to the fluid outlet rose from 20.8 in 1935 to 31.7 in 1954.

## 9. *Probable Changes in Milk Uses*

If our estimate of future milk production is reasonably accurate, it is obvious that the extra production will not be nearly sufficient to meet the total anticipated increase in the requirements for all dairy products consumed in the province. In view of this a continuation of the shift of milk from the less remunerative to the more remunerative uses may be expected. In practice this will mean a shift from creameries and cheese factories to fluid milk, ice cream and, to a lesser extent, concentrated milk markets. In addition part of the milk now consumed in farm homes will go to one or other of the several market outlets as the farm population declines.

Two things relative to this shifting process seem worthy of note. The first is that the extent of the shift will be limited by the fact that a large part of the total increase in milk production is going to occur on the specialized fluid milk farms. They are the farms with the large herds of high-producing dairy bred cows and with the specialized interest in the special business of producing milk. That much of the additional fluid milk required will be obtained by increasing the output on the established fluid milk farms is indicated by the fact that the Toronto market was supplied by nearly 200 fewer fluid shippers in 1955 than in 1954 even though a lot more milk was shipped in the later year.<sup>32</sup> Despite what has just been said it seems probable that the reduction of butter and cheese due to shifting will exceed any increase which may accompany technological improvements on the part of cheese and cream producers generally. If this is so it means that the provincial output of cheese and butter will decline as the shifting process proceeds. In the light of this prospect it would appear that, by 1980 and probably much earlier, additional cheese and butter will either have to come from elsewhere in Canada or from some other country or countries.

## 10. *Probable Requirements of Western Canadian Feed Grain*

It has already been suggested that the supplies of Ontario-grown grain are unlikely to expand much if at all over the future period being considered. On the other hand reference has been made to two kinds of developments which may be expected to result in more livestock and livestock products being produced per unit of grain consumed. One set of technological developments will have the general effect of permitting more meat, eggs or milk to be obtained from a given amount of grain. A second series of developments will make it possible to substitute more and higher quality roughage for expensive grain supplements in the dairy and beef cattle ration. Both types of development will help to minimize grain requirements.

<sup>32</sup> Figures supplied by W. H. Wilmot, Sec.-Treas., Toronto Milk Producers' Association.

When these considerations are related to the estimated production of livestock and livestock products, and when the amount of Ontario-grown and western grain required to produce the present output of these products is recalled, it would seem that the annual requirements of western grain must gradually increase and that they will be from 20 to 30 million bushels greater in 1980 than at present.



## THE PRAIRIE REGION

### *1. Changes in the Organization of Agriculture in the Prairie Region*

As an agricultural region the Prairie Provinces are a vital part of the Canadian economy. This region produces about half the farm cash income in Canada, employs about 40% of the Canadian agricultural labour force and produces about 95% of all the grain sold. In the provinces of Manitoba, Saskatchewan and Alberta, agriculture is a major industry. It represents about three-quarters of the gross value of production in Saskatchewan, a little less than half in Alberta, and almost two-fifths in Manitoba. Employment in agriculture occupies the time of one-third of the people gainfully employed in the Prairie region.

The agricultural settlement of the Prairies was accomplished within the experience of many Canadians still farming in the region. It is such a recent experience that trends in the rate of growth and changes in the direction of development are not easily produced. Nevertheless, before considering the direction of future changes, it may be desirable to review those which have taken place up to the present time. These changes are best considered in two general periods. The first, which began just before the beginning of this century, is the land settlement stage. Large-scale settlement came to an end about 1931. This date will be taken as the beginning of the second period, in which farming underwent considerable reorganization.

### *1. The Period of Settlement*

The opening up of the Prairie region to agricultural settlement has been well described elsewhere. For this study it need only be dealt with briefly.<sup>1</sup>

<sup>1</sup> Those who would like to review this period in detail should see W. A. Mackintosh, *Prairie Settlement: The Geographical Setting*, Toronto, 1934; the report of the Royal Commission on the South Saskatchewan River Project, and K. A. H. Buckley, *Capital Formation in Western Canada*, University of Toronto Press, 1955.

In the first 30 years of the present century the Prairie economy, based upon wheat as a main crop, was established. This is brought out clearly in Table 65. Land was settled rapidly and agricultural employment increased as settlement took place. The development was based on an expanding world market in wheat and favourable market conditions of a more general nature. It reached a peak between 1909 and 1911 and then developed more slowly, responding to the ups and downs in general economic conditions. Between 1921 and 1926 there was a period of retrenchment in which the number of farms was reduced while the average size of farm was increased. The area of occupied farms did not decline in this period and so boundaries underwent adjustment to produce the larger farms. Settlement continued but was modified by some land abandonment in eastern Alberta and southwestern Saskatchewan.

The land area occupied for farming in the Prairie region grew from 15.4 million acres in 1901 to 109.8 million acres in 1931, and the number of farms increased from 55 thousand to 288 thousand. The number of workers in agriculture rose from 79 thousand to 444 thousand in the same period.

Cultivated land was used almost entirely for growing wheat as a cash crop and for the production of coarse grains to be fed on farms to livestock. Horses provided the main source of power and land had to be used to provide them with feed. Other livestock, beef and dairy cattle and hogs, were of regional importance, but they did not affect the use of land very materially. The centre of development was wheat and the expanded acreage was being used to grow this crop. The Canadian wheat acreage, which was 4.3 million acres in 1901, had grown to 26.4 million acres by 1931 and almost all of this area was in the three Prairie Provinces. Since then the wheat acreage in the Prairie region has remained between 20 and 26 million acres.

Table 65

## ASPECTS OF DEVELOPMENT IN PRAIRIE AGRICULTURE

*(1) Land Settlement*

Year	No. of farms		Occupied land		Improved land	
	Canada (thousands)	Prairies (percentage)	Canada (million acres)	Prairies (percentage)	Canada (million acres)	Prairies (percentage)
1881.....	464	2.2	45.3	5.9	21.8	1.3
1891 <sup>a</sup> .....	—	—	—	—	—	—
1901.....	511	10.8	64.4	24.3	30.1	18.5
1911.....	682	29.2	108.9	52.9	48.7	47.1
1921.....	711	36.0	140.8	62.4	70.8	63.4
1931.....	729	39.5	163.1	67.3	85.7	69.8
1941.....	733	40.4	173.6	69.0	91.6	71.5
1951.....	623	40.0	174.0	71.2	96.8	74.2

*(2) Employment of Labour*

Persons occupied in agriculture (thousands)

Year	Prairie Provinces	Other provinces	Total	Prairies (percentage)
1881.....	15	647	662	2.3
1891.....	48	687	735	6.5
1901.....	79	638	717	11.0
1911.....	283	651	934	30.3
1921.....	376	666	1042	36.0
1931.....	444	688	1132	39.2
1941.....	421	789	1210	34.8
1951.....	396	547	943	42.0
1954.....	360	508	868	41.5

SOURCE: Decennial Census.

K. H. Buckley, *Capital Formation in Canada, 1896-1930*, p. 16, Table VI.*2. The Second Phase — Reorganization*

Between 1931 and 1951 the organization of agriculture underwent many changes. From 1931 to 1941 there was a drastic re-adjustment to market and drought conditions. In these ten years many of the mistakes of early settlement were discovered. There was a severe depression affecting the market for all agricultural products, but it was particularly severe on a form of farming which was extremely specialized in producing wheat for the export market. In the process of earlier settlement the full limitations of climate on production had not been realized. Some warning of the limitations of rainfall came in the early 1920's, but it was not until the 1930's that drought struck with a severity which resulted in farm abandonment and much hardship for many settlers.

Farming had to be adjusted to these conditions. Some areas went out of farming or were seeded down to permanent pastures. People were rehabilitated. It was a period of *ad hoc* programmes in which the emergency nature of the circumstances surrounding drought and depression left little time for long-range planning. By 1941 the worst mistakes of rapid settlement had been rectified and the agricultural economy of the Prairies was ready to adjust to the technological revolution of the next decade.

Land came into farming between 1931 and 1951 at a very much slower rate than in the previous 20 years. Between 1911 and 1931, 52.1 million acres were occupied for farming, whereas between 1931 and 1951 the net addition to the occupied area was only 14.1 million acres. The rate of settlement was uneven, reflecting the fluctuating trend of economic conditions over the period. The changes which occurred in occupied acreage and in improved land acreage are shown at census dates in Table 66.

Table 66

AREA OF LAND IN FARMS AND IMPROVED LAND AREA  
PRAIRIE REGION 1931-51  
(million acres)

	Occupied land	Improved land
1931.....	109.8	59.8
1936.....	113.1	60.9
1941.....	120.2	65.5
1946.....	117.6	65.4
1951.....	123.9	71.8

SOURCE: D.B.S., Reference Paper No. 25, Pt. III.

The net result of these changes was an increase of 12 million acres of improved land. During the same period there was an increase in the area in crops of 5.5 million acres, an addition of 5.0 million acres of summer fallow and an extra 1.5 million acres of pasture. The major change in cropping which came about as a result was the addition of 4.3 million acres of barley and 1.4 million acres of cultivated hay. These broad changes obscure fluctuations within the period, but it seems true to say that the additional land settlement made little change in the area devoted to wheat production. In 1931 there were 24.5 million acres in wheat and in 1951 there were 24.8 million.

Changes in the degree of specialization in cash grain farming are discussed briefly in Chapter 1. In the Prairie region some shift in emphasis has occurred from grain to livestock as a source of income. It is not a marked one, however, and, in the period 1951-55, grain still represented about two-thirds of the farm cash income. Grain represented three-quarters of the farm cash income in the period 1926-30, the major part of the change since that time being due to an increase in the importance of livestock and livestock products.

The greatest change which took place in Prairie agriculture over the period 1931 to 1951 was the rapid innovation of machines to replace men and horses. The use of machines gathered impetus after 1941 and increased with startling rapidity between 1946 and the present time.

The changes of the period since 1931 can be summarized in three main categories. First, there was a more limited extension of the area in farms and what there was did not expand the wheat acreage; second, there was some tendency for livestock to grow in importance as a part of farm production; and third, farming became much more mechanized, causing adjustments in the size of farms, in the amount of labour and in the amount of horse power used on farms. The major changes in farm organization which came about as a result are shown in Table 67.



Table 67

# RATES OF CHANGE IN FARM ORGANIZATION IN THE PRAIRIE PROVINCES

(1941 = 100)

	1931	1936	1941	1946	1951	1954-55
No. of farms.....	97	101	100	95	91	88
Size of farm.....	94	93	100	106	114	120
Labour per farm.....	108	n.a.	100	116	100	93
Horses per farm.....	118	103	100	78	47	33
Tractors per farm.....	75	72	100	140	252	n.a.
Combines per farm...	51	54	100	269	523	n.a.
Trucks per farm.....	51	49	100	139	313	n.a.
Livestock per farm...	n.a.	108	100	160	136	154
Operating expenses per farm.....	n.a.	107	100	124	142	133
						1947-55 (average)
Productivity						
Per farm.....	n.a.	67	100	126		155
Per occupied acre...	n.a.	72	100	119		129
Per worker.....	n.a.	n.a.	100	108		167

SOURCE: Compiled from D.B.S. publications relevant to each item.

The full significance of these changes can only be realized when they are considered in relation to distinctive farming areas of the Prairie region. These areas have distinctive features largely because of the variation in the physical characteristics of soil and climate. It is of some value, nevertheless, to consider the broad pattern of change over the Prairie region before considering each area.

The first aspect of change is shown in the number and size of farms. Since the time of early settlement there has always been a tendency for farms in the Prairies to adjust from the size of the initial homestead to a larger unit. At the same time, the settlement of new land added to the number of farms faster than consolidation of settled units reduced it, and this continued to be the case until 1941. Since then the rate of consolidation of farm businesses has outstripped the rate of addition of new farms, with the result that there has been a considerable drop in the number of farms. The result of consolidation has been a persistent rise in the size of farms, however, and, in this instance, the faster rate of consolidation and the smaller amount of new settlement since 1941 have combined to increase the rate at which the size of farms has increased.

The consolidation of farms in the Prairie region was necessary to adjust to machine farming. The nature of the mechanical revolution which swept across Canadian agriculture between 1941 and 1951 has been

described in Chapter 1. It was most effective in the Prairies. Tractors, trucks and combines were introduced rapidly particularly between 1946 and 1951. As machine farming took hold horses declined in number, and from many farms they disappeared altogether.

The machines not only replaced horses, but they made it possible for fewer men to handle larger areas of land. Prairie agriculture emerged from the ten years 1931 to 1941 with a labour force almost as large as at the beginning of the period, and with farm units not much larger. Some mechanization had been occurring but the years of depression and drought did not encourage much change in this direction. During the war period the supply of machinery was restricted and so, by 1946, labour employment per farm was actually greater than it had been in 1941. From 1946 to 1955, however, the drop in agricultural employment was 29%.<sup>2</sup> Farms were consolidated and both family and hired workers were replaced as mechanization became effective.

While the process of mechanization was occurring, electricity was being made available to an increasing number of farms. The spread of electricity into farming regions has been rapid since 1951, and the information available from the census at that date showed a considerable increase in the use of electricity over that of 1941. Many farms distant from power lines have installed their own generating systems. Farms within reach of power lines are likely to be fully supplied with electricity in all provinces by about 1960. However, electricity is still far from contributing all that it can to the efficiency of agricultural production in the Prairies, despite the fact that the number of electric motors rose 3.4 times between 1941 and 1951.

Changes in productivity over this period are not so clearly traced as the changes in farm size and the adjustments to mechanized farming. Crop production in the Prairie Provinces faces many hazards. There is always the danger that drought will occur, that hail damage will be severe, or that frost will damage the ripened crop. These dangers are more evident in some sections of the Prairies than others, but the risks of farming in this whole region are much higher than they are elsewhere in Canada. The fluctuations in output are well illustrated by the index of physical volume of production for the Prairie region as shown in Table 68.

The output of one year may be almost half that of the previous year, if crop conditions are poor. The fluctuations in this index are mainly due to the variations in wheat yields. This variability is distinctly higher in some areas than in others, but the fluctuations in the average yield for the Prairie region as a whole are a good indication of the high variability in output, even when the acreage changes only slightly.

<sup>2</sup> D.B.S., Reference Paper No. 58, *The Labour Force*, and monthly summaries for 1955.

Table 68

# INDEX OF PHYSICAL VOLUME OF AGRICULTURAL PRODUCTION (1935-39 = 100)

The Prairie provinces	
1941 .....	111.2
1942 .....	209.9
1943 .....	128.2
1944 .....	159.9
1945 .....	115.0
1951 .....	181.5
1952 .....	212.7
1953 .....	184.2
1954 .....	107.7
1955 .....	168.9

SOURCE: Special compilation for the Commission by D.B.S.

There is some belief that mechanization of grain farming has reduced the extent of the variability in wheat yields by enabling seeding and harvesting to be done at a faster rate than with horse power. Well-timed operations can make the best use of moisture conditions at seeding time and of good harvest weather. Whatever truth there may be in this, variability in crop output is likely to remain a feature of farming on the Prairies. The wheat crop is highly dependent on weather conditions in the growing

Table 69

# AVERAGE WHEAT YIELDS, SELECTED YEARS (bushels per acre)

	Prairie region	Southwestern Saskatchewan crop district 4
1935 .....	11.3	—
1936 .....	8.1	1.2
1937 .....	6.4	0.1
1938 .....	13.5	9.9
1939 .....	19.1	17.9
1951 .....	21.7	14.0
1952 .....	26.7	25.1
1953 .....	23.0	19.8
1954 .....	12.0	15.6
1955 .....	22.7	22.5

SOURCE: D.B.S., Reference Paper No. 25, Pt. I and the *Annual Report of the Department of Agriculture, Government of Saskatchewan*.

season. The variability in the future may be reduced by the timeliness of cultivation and harvest, but it cannot be removed. Should drought occur again, as severe as it was in 1936 and 1937, the result might not be quite so drastic, but output would certainly fall considerably.

Despite the variations in output, there is some indication of an upward movement in productivity per acre of land occupied for farming. Making some allowance for annual fluctuations, it seems likely that output per acre is now almost 30% higher than it was in 1941. With a decline in the number of farms occurring since 1941, this means that the physical volume of output per farm is more than half as high again as it was in 1941, and per man it is nearly 70% greater. There are indications that, gradually, the use of land in the Prairie region is becoming more intensive. Not only is the amount of machinery increasing, but the investment per acre in current capital and in livestock seems to have some upward trend also. The much greater increase in output per man than per acre indicates that the major influence of technology in the Prairie region has been to reduce labour input without greatly increasing output per acre. Some increase has been occurring in output per acre also, but it does not seem to have come about through a steep increase in operating expenses. At the average level of output of the 1947-55 period the constant (1949) dollar operating expenses of 1954 were only 10% higher per acre than in 1941.

Some of the upward trend in output may be due to a postwar tendency toward an increase in livestock production in the Prairie region. The high variability which has occurred in the output of both cattle and hogs in the Prairie region is due largely to the relationship between grain and livestock prices. Output of livestock increased very substantially and very quickly in the latter part of the war when there was a distinct price incentive. The increases in production came through a greater concentration of livestock in the existing areas of production rather than through the spread of production into new areas.

It is difficult to arrive at a good estimate of that portion of the Canadian supplies of hogs and cattle which comes from the Prairie region. The difficulty arises from two sources. First, there is considerable variability in the level of output, and second, there is no good statistical measure which adequately expresses the extent to which supplies originate in the Prairie Provinces. Three measures can be used to give some indication of the position. These are the proportion of farm cash income from livestock in Canada which is earned in the Prairie Provinces, the proportion of all marketing of cattle and hogs which takes place in the Prairies, and the proportion of all slaughtering of livestock which occurs there. Each of these has its limitations as a measure of the contribution which this region makes to livestock output, but they are all reflections of the extent to which a contribution is made.

The proportion of total Canadian farm cash income derived from the sale of livestock and livestock products coming from the Prairie Provinces is shown in Table 70.



Table 70

**PERCENTAGE OF CANADIAN FARM CASH INCOME  
ORIGINATING IN THE PRAIRIE PROVINCES FROM EACH FORM  
OF LIVESTOCK PRODUCTION  
(1926-30 to 1951-55)**

	Livestock	Dairy products	Poultry and poultry products
1926-30.....	32.0	17.9	24.9
1931-35.....	34.9	19.0	24.0
1936-40.....	38.6	18.8	24.8
1941-45.....	47.2	21.2	34.2
1946-50.....	40.2	20.0	23.1
1951-55.....	39.0	18.0	21.5

SOURCE: D.B.S., Reference Paper No. 25, Pt. II and annual series on Farm Cash Income.

In the 1941-45 period the increase was due to the large expansion in hog output, aided by the increase in production of cattle. From 1939 to the present time the proportion of Canadian farm cash income from cattle coming from the Prairie region has varied from 40% to 50% of the total. In 1953 and 1954 it was about 47%. The variation in the share of the Canadian farm cash income from hogs is much greater. It has been as low as 27% of the total and as high as 60% at the peak of Prairie output.

The highest proportion of total marketings of cattle coming from the Prairie Provinces occurred in 1946 when it reached 55%, but by 1950 this had fallen back to 38%. Hog marketings are more variable, having been as high as 77% in 1942 and as low as 30% in 1950. In 1944, when the output of hogs in Canada was the highest ever recorded, the Prairie region accounted for 65% of the total marketings.

The proportions of the numbers slaughtered which come from the Prairie region show a similar variation. This is a somewhat poorer measure, however, as it does not account for the considerable movement of live cattle to points outside the Prairie region. The proportion for cattle has varied from 35% to 45% over the last 20 years, reaching the maximum in 1946. The maximum proportion of hog slaughterings which originated in the Prairie Provinces was 60%, and it has been as low as half that figure.

The postwar boom in the cash grain market has subsided recently, and the Prairie region is once more turning toward the production of increased numbers of cattle and hogs. The decline in the number of horses has freed land for carrying cattle, and the limited cash market for grain has encouraged the finishing of both hogs and cattle. Although it is somewhat erratic, an upward trend in livestock carried per occupied acre can

be discerned from the figures on livestock inventories since 1931. In the postwar years this has been more marked, even though cyclical fluctuations are still taking place. In the postwar period the inventory of livestock, excluding horses, has been between 20% and 50% higher per occupied acre than in 1941.

The three major changes taking place in Prairie agriculture in the period since 1951 have been shown to be, first, a slower growth of new settlement, second, a readjustment to meet the conditions of mechanization, and third, a tendency toward increased output per acre of occupied land, which is partly the result of a slowly increasing tendency to carry more livestock. To make some judgment on what may be expected in each of these directions, the changes should be considered within certain distinctive regions of the Prairies. These regions can be distinguished through the characteristics of soil and climate which occur in each of them. The soils of the Prairie Provinces have been modified by two main types of origin — those developed under grassland cover and those developed under wooded conditions. Most of the agriculturally developed soils lie within the grassland region which extends northward from the United States border to a line drawn diagonally from the southeast corner of Manitoba to the point where the fifty-fifth parallel cuts the Alberta-British Columbia boundary.

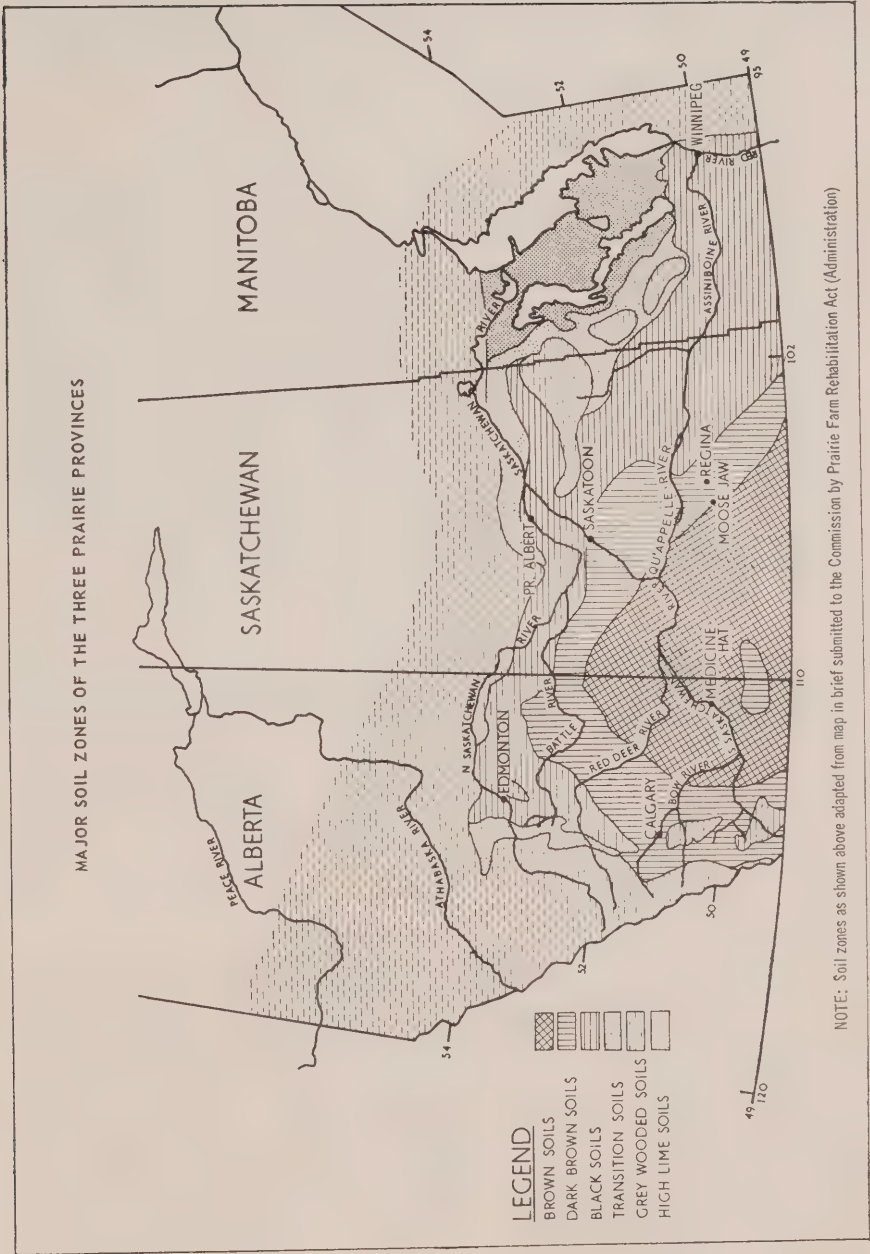
The four major soil zones in the Prairie Provinces ranging in order from south to north are called the brown, dark brown, black and grey-wooded soil zones. A transitional soil between the black and grey exists and is often sufficiently evident to constitute a fifth zone. In the inter-lake district of Manitoba a high lime soil exists which is classified separately. The zones are outlined on the map on page 253. A short description of each zone is helpful in illustrating the characteristics of each of them.

#### *The brown soil zone*

The brown soil zone covers the southwestern part of Saskatchewan and the southeastern part of Alberta. These soils are situated in a climatic belt which is classified as semi-arid, and they have a typical vegetative cover of short grass. Leahey has estimated that the area of this zone is 32.5 million acres, of which about 8 million is thought to be arable.<sup>3</sup> The acreage under cultivation on this zone at present exceeds this figure by some millions of acres, but there is no evidence of readjustment to approach Leahey's estimate of arable land.

The surface soil is light in colour with a low organic content. Under cultivation the organic matter is rapidly exhausted and soil drifting may occur. Water erosion can also be a problem. Although only 25% of the land area is thought to be arable, the remainder has value for agricultural

<sup>3</sup> A. Leahey, "The Agricultural Soil Resources of Canada", A. I. C. Review, Vol. 1, No. 5, 1946, pp. 285 - 289.



purposes because it furnishes good pasture if properly managed. This soil grows a good quality wheat, because the wheats with the highest protein content and best milling qualities grow under semi-arid conditions. The brown soil zone contains many of the large irrigation projects on which specialty crops are found.

*The dark brown soil zone*

The dark brown soil zone is also restricted to Saskatchewan and Alberta. Moisture conditions in this zone are better than in the brown soil zone. The soil was formed under grassland cover, but with heavier vegetative conditions than in the brown soil zone. It is located in a belt ranging from 50 to 100 miles in width bordering the brown soil zone. This soil has a higher organic content than the brown and a higher productivity because of better moisture-holding capacity and higher natural fertility. Including some soil classed as shallow black, this zone covers about 35 million acres, of which 21 million acres is classed as arable. While the land is well developed, some further increase in the cultivated acreage is possible, mostly in Alberta. Wheat is the main crop, and it is of high quality. The well-drained Regina heavy clays are within this zone, and these are classed as the best wheat land in Saskatchewan.

*The black soil zone*

The black soils lie between the soils of the open prairies which constitute the brown and dark soils and the forest region. These soils were formed under a cover of tall grasses. Moisture conditions allow greater diversification of crops than in either of the brown soil zones. The black soils cover about 42 million acres, of which 30 million are classified as arable. These soils are considered the most fertile in Canada. They give higher and more consistent yields of wheat than other soils, but farmers have taken advantage of their adaptability to other crops as well.

*The grey-wooded soil zone*

This zone lies between the Rocky Mountains and the Precambrian Shield in western Canada. The climate is sub-humid. Trees cover most of the zone, but there are occasional patches of parkland. The area of the zone is very large although the amount which is arable is rather small. It contains the largest amount of potentially arable land in Canada, but the cost of clearing and settling it would be considerable. The grey-wooded soils have a thin surface layer of organic matter followed by the leached horizon common to forest soils, and are considerably lower in natural fertility than the grassland soils.

*The high lime soil zone*

The high lime soils common to the inter-lake district of Manitoba have developed from parent material containing an excess of limestone.



The soil profile is shallow. Much of the land has been abandoned, and it is felt that agriculture could not be greatly extended within this zone. For the considerations which follow, this zone has been included with the grey-wooded soils.

## *II. Aspects of Change by Soil Zones, 1931-51<sup>4</sup>*

### *1. The Brown Soil Zone*

This is a dry area of low rainfall within which the main enterprise is wheat production. It produces good quality wheat because the growing season is warm and dry. Apart from the development in irrigated regions, there has not been much change in land settlement or land utilization in the last 20 years. The amount of land occupied for farming increased over the whole period from 27.6 million acres to 29.5 million acres, out of a total area of 34.6 million acres. Land occupied for farming was reduced in the 1931-36 and 1941-46 periods, but the occupation of additional land in the other periods more than counteracted this. The net addition to improved land, however, was only 0.5 million acres over the 20 years. This tends to support the suggestion of the soil scientists that no new land is available for settlement or improvement in this region.

Very little change has occurred in the utilization of land over the period. About 50% of the occupied land is improved, and of this, about 90% is in wheat, oats, barley or summer fallow. There has been some tendency to substitute barley for oats, and the amount of cultivated hay has increased. Generally speaking, however, there has been no significant change in either the pattern of land utilization or the amount of land used. Grain production is determined by the availability of moisture. To conserve the moisture available, summer fallowing is essential. A large part of the unimproved acreage is natural pasture and is used for the extensive grazing of cattle.

This zone grows from about one-quarter to one-third of the wheat produced in the Prairie region. More than two-thirds of the cash income came from wheat in 1950, and the other main source of income was from cattle raised on the extensive grazing areas.

The major change which took place in this zone was in the second of the three general changes occurring in the Prairie region, namely, that of consolidation to adjust to mechanization. In the process, larger and more efficient farms have been produced. A change in the number of farms came about because of an attempt to adjust to poor settlement on land unsuited to cultivation and because of increases in scale due to the increase in mechanization. The reduction in the number of farms is shown in Table 71.

<sup>4</sup> All statistics related to soil zones were compiled by grouping data by census division into areas which corresponded as closely as possible with soil zone boundaries.

Table 71

ESTIMATED NUMBER OF FARMS IN THE BROWN SOIL REGION  
1931-51

	Number of farms (thousands)	Percentage of 1941
1931.....	45.2	113
1936.....	40.8	102
1941.....	40.0	100
1946.....	36.5	91
1951 <sup>a</sup> .....	30.5	76

a In all data of farm numbers no adjustment is made for the change in census definition and enumeration of farms between 1941 and 1951.

SOURCE: *Census of Agriculture*.

The number of male workers fell from 51,000 in 1941 to 43,000 in 1946, and by 1951 it had reached 36,800. As a result of these changes, each man was handling 44% more improved acres by 1951 than in 1941. Machinery investment rose so that by 1951 there were two and one half times the number of combines and trucks per 100 farms, and almost twice the number of tractors. The number of electric motors used per farm increased almost ten times. As a result of mechanization two out of every three horses on every farm were dispensed with. The average size of farm in the zone was 31% bigger in 1951 than in 1941. The number of farms over one section (640 acres) in size increased between 1931 and 1951 from 30% of those over 100 acres to 50%, and one-quarter-section farms fell from 18% to 8%.

These indications of reorganization suggest that the wheat farms in this zone are becoming bigger and more efficient as time goes by, and that this process is occurring through a reduction in the number of farming units accompanied by more machinery and a reduction in the amount of labour required. There is evidence that the process is far from being completed. In 1950, 25% of the farms were producing gross revenues of less than \$1,200 per year. Some reorganization must occur, if some of these businesses are to survive as economic farm units.

The major difficulty which farms in the brown soil zone have experienced is the large fluctuation which is apt to occur in the yield of wheat. Wheat yields are, on the average, about four bushels per acre less than those in the dark brown soil zone, and six bushels per acre less than in the black soil zone. The wheat, however, is generally of high protein content and is more likely to sell in the higher grades. The hazards of fluctuating yield become less severe as farms become larger and storage systems are devised. Nevertheless, in some crop districts in the last ten years, yields have varied from 3 to 20 bushels per acre.

## 2. *The Dark Brown Soil Zone*

This is also a semi-arid zone and one which specializes in wheat production. It produces consistently the best wheat grown in Canada. The land area amounts to about 40.4 million acres, of which the amount in farms has increased from 30.0 million acres to 31.6 million acres between 1931 and 1951. Practically all of the increase in occupation occurred in the last five years of the period. The net addition to improved land was 1.6 million acres, and most of this was added between 1946 and 1951. The amount of land suited to occupation and not yet occupied is quite limited and is to be found only in Alberta. About two-thirds of the occupied land is improved, and it seems unlikely that this ratio can be increased in the future.

The pattern of land utilization has been fairly static. Roughly speaking, 92% of the improved land has been used for wheat, oats, barley and summer fallow, and about 75% has been devoted to wheat and summer fallow alone. The trend in the acreage devoted to oats is slightly downward, and that devoted to barley slightly upward, although neither movement is very distinct. Cultivated hay is not important, but there was some increase in the land area devoted to it. It is the most important wheat-producing area in Canada and accounts for more than one-third of the wheat acreage in the Prairie Provinces. Most of the zone lies in Saskatchewan. In 1950 the proportion of cash income coming from grain in this soil zone was 78% in Saskatchewan and 51% in Alberta. Cattle were next in importance, providing 13% of the income in Saskatchewan and 33% in Alberta. Income from other sources of livestock was unimportant.

In this soil zone, also, the major change in the last 20 years has been in the number and size of farms (see Table 72).

Table 72

### ESTIMATED NUMBER OF FARMS IN THE DARK BROWN SOIL REGION, 1931-51

	Number of farms (thousands)	Percentage of 1941
1931.....	64	105
1936.....	63	103
1941.....	61	100
1946.....	55	90
1951.....	48	79

SOURCE: *Census of Agriculture.*

The reduction in the number of farms was accompanied by a fall in labour input and a rise in the use of machinery very similar to that in the brown soil zone. By 1951 there were four times as many combines per 100 farms, three times as many trucks, and twice as many tractors as there were

in 1941. The number of male workers fell from 75,700 to 55,300 and horses declined in numbers as quickly as in the brown soil zone. By 1951 the most common size of farm was the one-section unit, and the number of one-quarter-section farms was falling steadily so that they were less than half as important in 1951 as they had been in 1931. The average size of farm increased by 30%. Despite these adjustments, nearly one-fifth of the farms in this zone in 1951 were producing gross revenues of less than \$1,200, and some 10% were less than 160 acres in size. The reorganization of farm boundaries is therefore likely to continue.

Fluctuations in output are not quite as severe as they are in the brown soil zone. The average yield of wheat over the last 20 years was about 16 bushels per acre, but in the last ten years average annual yields in particular crop districts have been as low as 6 bushels and as high as 25 bushels per acre. Cattle and hog production provide some degree of stability to farm income, but a high degree of variability still remains.

### 3. *The Black Soil Zone*

This zone stretches across all three provinces. It contains productive soils which give higher crop yields than either of the brown soil zones, and, because of the higher rainfall, the farming has tended to be more mixed in nature.

The total area is about 50.5 million acres, of which 36 million acres was in farms in 1931 and 40 million acres in 1951. The rate of growth in the occupied farming area has not been even over the 20-year period. More of the expansion took place before 1941 than after it, and between 1941 and 1946 there was a slight decrease in the occupied area. The area of improved land has increased from 19.5 million acres to 24.7 million acres over the 20-year period. More land was improved than was added to farms, and there are indications of a trend in this direction. The proportion of the land in farms which is improved has increased from 55% to 62%. There is some indication of a decline in the proportion of improved land devoted to wheat, but the proportion in summer fallow has increased slightly. The acreage in oats has not changed much over time, but that in barley has almost doubled in the 20-year period. The trend can be best expressed by pointing out that in 1931 wheat took up 36% of the improved land and coarse grains about 28%. In 1951 wheat occupied 27% of the improved acreage and coarse grains 31%. The trend upward in the acreage of cultivated hay is slow but persistent.

Thus, although the signs are far from being well developed, there is ground for believing that this area will continue to produce more coarse grains and fodder crops, and that wheat will become proportionately less important.

The pattern of cash income gives some indication of the extent to which farming is more mixed than that in the brown soils. In the area of



black soils in Alberta only 36% of the gross revenue in 1950 came from grain, and 28% from cattle, along with a further 17% from dairy products. Over the whole zone, 59% of the income was from grain and 20% from cattle.

Adjustments to technological change have occurred in this zone too, but they are somewhat less marked than in the brown soil zone. Farms are smaller and more numerous. They are changing size more slowly, and so the change in number of units is more gradual.

Table 73

### ESTIMATED NUMBER OF FARMS IN THE BLACK SOIL ZONE 1931-51

	Number of farms (thousands)	Percentage of 1941
1931.....	106	95
1936.....	113	102
1941.....	111	100
1946.....	103	93
1951.....	97	87

SOURCE: *Census of Agriculture.*

The expansion in acreage which has occurred in this region has added new farms as well as brought about an increase in the area of existing farms. The mechanical revolution had its impact here as elsewhere so that, with fewer men employed, more acres were farmed. There was a 44% increase in the number of improved acres handled per man between 1941 and 1951. The change in farm size was largely from one-quarter-section units to half-section units and, in 1951, the proportion of farms of three-quarters of a section or over was only one-third of the total. Machine power was added at a greater rate than on the brown soils, because the number of combines and trucks existing on farms on the black soils in 1941 was very small. The number of male workers fell from 168,000 in 1941 to 127,000 by 1951. One out of every two horses per farm was dispensed with during the same period.

There are three general changes occurring in this zone. Land is still being occupied, the emphasis in land use is away from wheat, and the adjustment to technology is bringing about a gradual increase in the size of unit. More of the last two changes are likely to be seen in the future. Nearly one-quarter of the farms in this zone had a gross revenue of less than \$1,200 in 1950, and nearly one-quarter of them were one-quarter section or smaller in size.

Fluctuations in output are considerably less marked than in either of the semi-arid zones of brown and dark brown soil. Higher average yields of all grains are obtained, and more hogs are carried, providing an alternative

source of income and preventing incomes from fluctuating severely. The lowest wheat yield experienced in the last ten years was in 1954, but even in that year no crop district in the zone had a yield of less than 13 bushels per acre. The 20-year average yield is 18.5 bushels per acre. The wheat grown is of more variable quality than that produced in the semi-arid plains of the brown and dark brown soils. Although livestock and livestock products make up the major source of farm cash income, one-quarter of the Prairie wheat acreage was in this zone in 1955.

#### 4. *The Grey-Wooded Soil Zone*

The grey-wooded soils are much poorer than the black soils. The total area of grey-wooded soils is large, but the area used for farming is rather small. Of an estimated total area of 59 million acres, there were 15 million acres in farms in 1931 and 20 million acres in 1951. (This excludes the Peace River District of Alberta, which will be described separately.) The proportion of occupied land which was improved rose from 39% to over 50% between 1931 and 1951.

As the area in farms has increased, the acreage in barley has risen, but that in wheat and oats has remained almost unchanged. Barley now occupies three times the acreage it did in 1931, and cultivated hay takes up more than twice the 1931 acreage. New occupation of farms in this zone has established a trend toward a type of farming which is devoted to feed production and the raising of livestock. The wheat grown is generally of poor quality, although the average yield is higher than in any other soil zone.

Contrary to the trends in other zones, the number of farms increased steadily until 1941 as new farms were settled. Since then, mechanization has resulted in consolidation and probably some abandonment (see Table 74).

Table 74

#### ESTIMATED NUMBER OF FARMS IN THE GREY-WOODED SOIL ZONE, 1931-51

	Number of farms (thousands)	Percentage of 1941
1931.....	62.7	83
1936.....	74.4	99
1941.....	75.4	100
1946.....	66.2	88
1951.....	63.1	84

SOURCE: *Census of Agriculture.*

The number of male workers employed fell from 108,500 to 78,600 between 1941 and 1951. By 1951 each man employed was handling 75% more improved acres than in 1941. This was achieved through a rapid

increase in trucks, combines and tractors. The rate of mechanization was so rapid that it leaves the impression that a considerable amount of consolidation of farms has yet to take place. By 1951 farms were 25% bigger on the average than in 1941, but farms of one-quarter section still made up about two-fifths of the total number. The pioneer nature of farming is shown by the fact that in 1950 more than 40% of the farms produced gross revenues of less than \$1,200.

The emphasis has been as much on land settlement as on re-organization to adjust to technological change. More land is being used for the production of coarse grains and fodder crops as the land area increases.

##### 5. *The Peace River District of Alberta*

This district is similar in soil type to the grey-wooded soil zone, but there are some areas of better soils, and some of it is excellent farmland. The Peace River District is far from markets, and this has hindered land settlement to some extent. The area of land within the Alberta part of the Peace River District amounts to about 21.4 million acres, of which only a small proportion is occupied for farming. In 1931 it was 2.4 million acres, and by 1951 it had risen to 3.3 million acres. The proportion of occupied land which was improved rose from one-third to one-half over the 20-year period. Wheat now takes up only 30% of the improved land area, whereas 20 years ago it took up 60%. Barley acreage and the acreage of cultivated hay rose as new land was occupied, until it is now ten times greater than 20 years ago. There is a clear trend, therefore, toward coarse grain and forage production as development takes place.

The number of farms now is about the same as it was in 1941, despite the tendency for farms to increase in size. New occupation of farms has kept pace with consolidation of existing farms. This is shown also in the slower rate of decline in agricultural employment. The number of male agricultural workers declined from 12,300 in 1941 to 10,800 in 1951. The fact that farms in this district are still being established helps to explain why, in 1950, more than 50% of them had gross revenues of less than \$1,200.

The most pronounced tendency in this district is for farms to grow in number and for the land area in farms to be increased. Some adjustment in size must come about because of the number of low-income farms, but the rate at which this will occur may be rather slow.

##### 6. *Some Generalizations from Regional Trends*

As the evidence presented in the descriptions of soil zones suggests, the hazards of farming in the Prairie region become less pronounced as one proceeds from the semi-arid brown soils through the dark brown

soil zone into the black soil zone. The emphasis on a form of monoculture, with wheat as the sole source of income, also declines. Farms become smaller in size and more diversified in operation; then productivity per acre rises. As one proceeds northward into the forested zone, however, the soils become poorer and thinner and this, along with the isolation from centres of population, tends to produce farming which is still in the pioneer stage. Farms in the grey-wooded soil zone are on the fringe of agricultural cultivation in almost every sense. The varying emphasis of the three processes of change in each of the soil zones is also apparent.

No new settlement is occurring in the semi-arid areas of the brown and dark brown soils. A limited amount is still taking place in the black soil zone, but not much land remains to be occupied. Land settlement has been occurring to the greatest extent in the last 20 years on the northern fringe of settlement.

The process of mechanization has taken hold with the greatest effectiveness in the broad plains of the semi-arid zones where farms are being organized into bigger and bigger units for the purpose of either wheat production or cattle ranching. On these soils the emphasis has been on a rearrangement of farms to produce higher output per man without much alteration in the type of farming and with little change in the output per acre.

In the regions of higher rainfall, livestock are produced and the dominance of wheat farming declines. In these areas some progress is being made in the use of techniques to raise output per acre as well as per man. It is becoming progressively more difficult to press northward to extend the area occupied by farms, and there is a gradual tendency for the productive capacity of existing farms to be improved.

To generalize still further, there have been three processes occurring in the farming of the Prairie Provinces. The process of settlement, which is taking place at a declining rate and is now pushing into the more isolated regions of poor soil; the process of intensification of production on the remaining land, which has taken place with greatest emphasis in the black soil zone and in parts of the dark brown; and the process of mechanization, which is causing an adjustment to farm boundaries and bringing about larger farms, with fewer men and horses. This last process is most evident where farming is already most extensive, namely in the brown and dark brown soil zones.

### *III. Future Development*

#### *1. The Agricultural Potential of the Prairie Provinces*

The potential development of agriculture in the Prairie Provinces is very considerable. Any area can develop in one of four ways. (1) The area of land in use may be extended; (2) the land already occupied may



be used more intensively; (3) technological advances may result in higher outputs; or (4) the efficiency of the farm itself can be improved through better organization of the business.

The amount of land physically suited to agricultural use and not yet settled is still quite considerable, the actual range in estimates of land suited to agricultural settlement being very wide. Much of the land that is left is inaccessible to market and could only be settled at considerable cost because of the necessity of clearing the land of trees or draining swamps, or because of other costly forms of development. The largest amount of land suited to settlement lies in the northern fringe areas of the three provinces and particularly in the grey-wooded soil region of Alberta. This land is far from centres of population and, if it were settled, the cost of providing roads, schools and other social services would be high.

Estimates of land which can be cultivated vary according to the extent to which development is thought to be necessary. It is evident from the past trend that land is being settled at a much slower rate as time goes on. What is left for settlement becomes progressively less suitable for cultivation, so that the possibilities of intensifying the use of land already settled become much more attractive than they were formerly.

Land suitable for agricultural settlement in Alberta is estimated by various soil specialists at between 6 and 11 million acres. The greater part of this is to be found in the Peace River District, and in the fringe areas around the black soil zone. It has been estimated that there exists in the dark brown soils some 2 million acres of unbroken arable land, another 2 million acres in the black and transitional soils and 5.4 million acres in the grey-wooded region of the province.<sup>5</sup> On the other hand, the estimates of land which is immediately available for settlement are much lower than this.<sup>6</sup>

In Saskatchewan there is only one block of land which could be made available for settlement in the next 25 years. It lies east of Carrot River and Ravendale and extends to the Manitoba border at The Pas. It is sometimes called the Carrot River Triangle but is more properly designated as the Lower Saskatchewan Valley. It is subject to flooding and a larger dyking and drainage programme would be necessary to protect it. Within this region the soil scientists estimate that about one million acres could be made available. It is also estimated that new clearing and breaking within the existing settled area could add a further 1.5 million acres. This is considered more likely than the development of the Lower Saskatchewan Valley because of the high costs involved in draining and

<sup>5</sup> *Farming in Alberta*, Publication No. 40, Province of Alberta.

<sup>6</sup> See *Public Lands Open for Settlement in the Fringe Area of Central Alberta*, 1953, and *Public Lands Open for Settlement in the Peace River District*, Alberta, 1951, published by Department of Lands and Forests, Province of Alberta.

dyking in that region.<sup>7</sup> Estimates from various authorities in Manitoba regarding the land area that might possibly be made available under conditions of scarcity vary widely. The highest is 7.7 million acres, but it seems generally agreed by those familiar with land resources that the land suited to immediate use does not amount to much more than one million acres.<sup>8</sup>

There is evidence from the previous pattern of development that there is considerable room to increase the use of land resources through the improvement of land which is presently occupied but still unimproved. Still further additions can be made in this way on the black and grey-wooded soils particularly.

It is practically impossible to obtain an inventory of the full resources available. Should the pressure of demand require it, the extent of development which can occur is very considerable and could easily reach the level of the occupied acreage added over the 1931-51 period. This was 14 million acres. It must be stressed, however, that such land development could only come about by incurring extremely high costs. In the light of the estimates on demand in Chapter 2, and taking due recognition of the costs of settlement, it seems unlikely that in the next 25 years more than 5.5 million acres of new land will be settled in the Prairie region.

It is also possible to increase production by increasing the area of each farm which can be cultivated. The increase in the improvement of occupied land in the black and grey-wooded soils has already been noted. If this process were continued further it would result in a rising percentage of the occupied land area which could be cultivated in some form. There are limits, however, to the extent to which this can occur.

In the brown and dark brown soil zones, the percentage of occupied land which is improved to some degree has remained almost constant since the land was settled. It is about 50% for the brown soils and 66.6% for the dark brown soils. There seems to be little opportunity to improve land any further; the proportion of improved to occupied land in these soil zones is therefore expected to remain much as it is.

In the black soils, however, the proportion has risen steadily from 55% to 62% of the occupied acreage between 1931 and 1951. Some land can still be improved; this would result in a further increase in this ratio. By 1980 it may reach 66%. In the grey-wooded soils improvement can only occur after the land has been cleared of bush cover or trees. The proportion of occupied land improved has increased in the 20 years

<sup>7</sup> Information supplied to the Commission by the Department of Soils, University of Saskatchewan.

<sup>8</sup> The upper limit suggested in the submission to this Commission of the government of Manitoba was five million acres. It was considered unlikely that more than one million of this would come into use in the next 25 years.

from 1931 to 1951 from just over one-third to just over one-half of the occupied area. It is expected that increases in the amount of improved land will continue, and that by 1980 it will be about 60% of the occupied area. If this rate of improvement takes place, the ratio of improved land to occupied land in the Prairie region would rise from 58% to 61% by 1980. This would produce an additional four million acres of improved land from the area which is expected to be in farms at that date.

Intensification of land use through the addition of more of the other factors of production to land has some limitations in western agriculture, but they have not been reached in most areas. One possible method of intensification is the addition of fertilizer to land. Fertilizer is not used much in the three Prairie Provinces despite the fact that soil scientists have gone to considerable pains to demonstrate the increases in output which can be obtained. In 1954 the three Prairie Provinces used a total of 75,000 tons of fertilizer, just under one-tenth of the total used in Canada. It was an increase from 21,000 tons in 1938, when the three provinces used only 6.5% of the fertilizer being used in Canada. Although the constant (1949) dollar expenditure on fertilizer per acre of improved land increased considerably between 1941 and 1951, it was still only 13 cents per improved acre in 1951.

The use of commercial fertilizer requires the presence of sufficient moisture to make the nutrient elements available for plant use. The dry farming areas of Alberta and Saskatchewan respond poorly to its use. In some years, when the precipitation is above average, a substantial increase in yield is obtained, but, over a period of years, there is a relatively small increase in yield. In the northern humid area of the Prairie Provinces, within the black and grey-wooded soil zones, better results can be obtained. Most experiments carried out to test the response to fertilizer indicate substantial yield increases in the humid areas, and it is likely that in these zones considerable increases in grain yields would be possible.

The data on average yields of wheat, oats and barley in the Prairie Provinces show such wide variations from year to year that it is difficult to suggest that yields per acre are moving up. It can be argued with some justification that the effect of fertilizer application has yet to be felt, and that it remains as a potential means of increasing output.<sup>9</sup>

In the black soil zone and on the grey-wooded soils, rotation farming with legumes in the rotation has been advocated by soil scientists for some considerable time. This does not hold out any hope for increased production in the brown soil zone, and although it may have some place in the dark brown soils, the soils of higher humidity are most suited to

<sup>9</sup> Chapter 4 dealing with technology provides some discussion of movements in grain yields in the Prairie Provinces.



rotation farming. The practice of summer fallowing is necessary to conserve moisture, and it does not seem likely that it can be replaced in the arid regions. All the evidence with respect to the black and grey-wooded soils, however, indicates a higher proportion of land being fallowed at the moment than good farming requires. If intensity of operation is called for, a good part of it may come from the adoption of more legumes and the reduction of land in summer fallow. Soil scientists suggest that summer fallowing could be entirely eliminated in these areas and that the land would yield better as a result. The change in this direction is likely to take place, but such practices are only adopted slowly and the elimination of summer fallow by 1980 is very unlikely. It is likely that in the grey-wooded soils the necessity of more rotation farming to keep the soil in good condition will do much to reduce the practice of summer fallowing. The amount of land devoted to summer fallow in 1955 in the black soils was about 7.5 million acres or 30% of the improved land; in the grey-wooded soils it was 3.8 million acres or 31%.

Weeds reduce output per acre. Like economic crops, they thrive best under certain soil and climatic conditions. Owing to the widely varying conditions throughout the Prairie region, the type of weed infestation varies greatly from area to area. Wild oats constitute a particular problem on the black soils, but mixed farming rotations instead of wheat-summer fallow operations can be a considerable factor in their control. Where mixed farming rotations include two years of hay, this weed is almost completely eradicated. In the brown and dark brown soils rotation farming does not give good results, and wild oats are only eradicated through shallow ploughing and summer fallow operations. Any development which controls weeds will increase the productivity of the land resources.

Applications of chemical sprays and dusts have been finding an increasing place in western farm practices. The expense of the treatment, the difficulty of obtaining sufficient water supply, and the effect of unfavourable weather conditions limit their use. Considerable improvements in this method of weed control are still possible, and the future effects should be considerable.

Intensification of land use is also possible through irrigation. In Alberta there are approximately 760,000 acres under irrigation at the present time in the prairie part of the province, plus about 28,000 acres in the hilly regions. Saskatchewan has about 12,000 acres under irrigation at present, mainly in the Swift Current irrigation district and other small private projects. Estimates of land being irrigated in projects underway, or to be constructed in the near future, will about double this figure, so that, on the completion of all projects being developed, there will be over 1.5 million acres in irrigated farms in Alberta and Saskatchewan.

Very little of this land is being farmed as intensively as the cost of irrigating it would warrant. There are four main types of farm in the



irrigated regions: grain, livestock, specialty crops and mixed farming types. On most farms more than 50% of the land is in grains, mostly wheat. The specialty crops are grown in a limited region and mixed farming is followed on the larger farms. The acreage devoted to specialty crops will increase and livestock feeding operations are likely to expand. For many more years, however, a considerable part of the income is likely to be derived from grain. Both from an agricultural and economic point of view it is unsatisfactory to have irrigated farms producing grains. A study of irrigated farms in Alberta showed that only those farms where a specialty crop was grown were able to sustain themselves over a period of years.<sup>10</sup> In addition, the fertility of irrigated land can only be maintained if organic matter is returned to the soil. On sugar beet farms the residue makes a useful feed for cattle, and the cattle can provide organic matter. The result is that the winter finishing of cattle and sheep has become common on specialty-crop irrigated farms. It can be expected that in the future the irrigation farmer will include livestock in his programme. There is much room for intensifying the use of irrigated land at present in use, or being developed for use, without considering new projects. It is difficult to foresee conditions which would require such a high level of output that all of this irrigated land would be farmed as intensively as the cost of irrigating it would warrant. It is even more unlikely that the demand for food will rise to a level which would justify much further irrigation.

Advances in technology may also increase output. Much has already been achieved in the control of rust, smut, and insect epidemics, and in developing hardier varieties of grain. Such research will continue and is likely to minimize the periodic losses resulting from pests and plant diseases. In the long run these efforts, along with the development of drought-resistant and higher yielding varieties of grain, should have a considerable effect on grain yields.

The production of hogs in western Canada has been an in-an-out proposition for many producers. Very little attention has been paid to breeding productive sows, or to progeny records. Few farmers attempt to produce more than one litter of hogs per year. Scientific feeding and modern methods of rearing have yet to be applied, largely because it has never seemed sufficiently profitable to adopt them. Much the same can be said about improvements to pasture land for beef cattle and also about the production of hay. The application of techniques now known could make a vast difference to the efficiency of livestock production on the Prairies. Further scientific developments are likely to increase this potential.

There is, therefore, much opportunity for increasing output. It exists in the land available for development, in the application of fertilizer to

<sup>10</sup> C. C. Spence et al, *Farming in the Irrigation Districts of Alberta*, publication 793, Canada Department of Agriculture, 1947.

land, in weed control, in rotation farming, in the more intensive use of irrigated land, and in the application of scientific knowledge to cereal breeding and to animal production. Finally, the management of farms presently occupied could be so improved that output could be raised per man employed and per acre.

## 2. *The Prospective Changes in Agricultural Organization*

In the next 25 years the agricultural organization of the Prairie Provinces will be more influenced than it has been in the past by the trend in the domestic demand for food. The domestic demand for meats is likely to require a level of meat production by 1980 over twice that of the average of the 1951-55 period. Most of the increase in production must come from the Prairie Provinces. The demand for wheat is expected to continue at a level sufficient to maintain an acreage in the crop near the level considered normal for Canada, that is, 24 to 26 million acres. The output of coarse grains will have to rise substantially if the meat required is to be produced; both expansion in acreage and increased yields will be necessary. The greatest part of the increase in coarse grains and in forage crops will come about in the northern areas of Alberta and Saskatchewan and all across Manitoba. In the brown soils the cattle-carrying capacity will be increased as the price of meats relative to other commodities rises and makes the investment in better grasses a worthwhile proposition.

The pattern of development can be traced by soil regions and some idea of the relative importance of the aspects of change can be gained in this way.

It has been noted already that in both the brown and dark brown soil zones the pattern of land utilization is fairly static and no land development of any significance is taking place. Some greater intensity in the use of wheat lands may occur in the latter part of the 25-year period, if the use of fertilizer becomes attractive. This is likely to be the only intensive aspect of land development to occur. The main change will be toward larger wheat farms which will be farmed with a wider range of field equipment. The two-section wheat farm will be common, and the use of labour per farm will decline. Some of the driest areas of southeastern Alberta and southwestern Saskatchewan which are still in farms are likely to be put into grazing land, and the carrying capacity of grazing lands will be increased.

In the brown soil zone the irrigated regions are the only ones where the land is likely to be used more intensively. Domestic markets for specialty products are bound to increase and bring about a more intensive use of the irrigated farms. The area devoted to grain on these farms will decline, and more beef cattle are likely to be fattened as a supplementary enterprise. Irrigated farms are unlikely to increase greatly in size, but the output of fodder, beef and specialty crops per acre can be doubled without

raising costs steeply, if full use is made of the water resources and if fertilizer is applied.

In the dark brown soil zone, the main wheat-producing belt of Canada, changes in farming structure and land use are less obvious. The adjustment to larger wheat farms will continue, but there is room for some intensification also. The supplementary feeding of cattle and hogs may become more common as part of a farm business in which wheat predominates as a source of income. This will mean some modifications in farming, and a somewhat greater emphasis on coarse grains than has been customary. The means by which farms in this area can become more intensive are the modification of summer fallow and the addition of rotation pasture on which beef cattle can be carried. However, assuming, as we do, that the market for wheat will remain strong, this area is not likely to adopt livestock in anything more than a supplementary fashion. The carrying of livestock is more likely on the dark brown soils of Alberta than on similar soils in Saskatchewan, because it is easier to provide fodder supplies in Alberta. Changes in the farming of this area are likely to be slight. A greater extension of scale is probable, and a slight intensification toward more hogs and cattle will probably come about as the period draws to a close.

In the black soil zone changes will probably be considerable. The adjustment to a size of farm suitable for livestock as a main source of income, and big enough to support a family, has a long way to go. There is also some room for land improvement in this area, and the total amount of land under cultivation will increase. Half and three-quarter-section farms will become more common, and those of a quarter-section are likely to decrease until, by the end of the period, they will be uncommon.

The pressure toward a livestock economy in the West will ultimately bring about a reduction of the practice of summer fallow and an increased intensity of land use. Coarse grain yields may be increased considerably through the use of fertilizer and the practice of rotation farming. The acreage in wheat may be reduced, but, because of improved farming methods, yields are likely to be increased with the result that output will not be altered much. Should the level of demand justify it, wheat will continue to be of importance as a cash crop, but it will become proportionately less important as the acreage of coarse grains expands and livestock feeding becomes established. The mainstay of this livestock economy will be grain-fed animals, with a tendency for specialization in hog production.

Thus, in this area of all three provinces, three aspects of change will continue: land settlement will become progressively more difficult and will probably have ceased before the end of the 25 years; farms will get bigger, but only slowly; and means of mechanizing the feeding of hogs



and cattle are likely to become as important in farm organization as the utilization of field equipment.

A move toward more intensive farming is not likely to take place quickly; it may not be evident for about another ten years. It is likely to come about as population grows and incomes rise. As these developments take place, prices will rise and stimulate the use of rotation farming and the application of fertilizer.

In the grey-wooded soil zone, land settlement and the reorganization of farm boundaries have been the main trends of recent years. Many farms in this zone are still quarter-section units, and grain farming provides a meagre living. Changes in scale are likely to come about within the next ten years so that half-section units will be more common, and the tendency for the scale of operations to move upward will probably continue. Land will continue to be settled in this area, but the rate of settlement is likely to be slow. Future expansion may help to increase the size of farm rather than the number of farms. The amount of summer fallow in this area is likely to be reduced as the second half of the 25-year period is reached. Within that period it is probable that more intensive farming operations will occur and that the area will become a substantial producer of coarse grains and fodder which can be utilized within the area itself or sold to other farmers for feeding.

The rate at which these changes will come about is uncertain. For the next ten years or so the main requirement in the Prairie region will be to adjust to the size of farm which can provide a satisfactory income, and to do this through extending the scale of the business rather than increasing the volume per acre. At the end of a ten-year period the demand for meat in Canada will have reached a level which will encourage more intensive use of land. The emphasis may turn toward methods of increasing the carrying capacity of grazing land, producing more fodder crops, and modifying the practice of summer fallowing to make available more land for grain and hay. These changes are likely to be felt most in the black and grey-wooded soil zones.

In the semi-arid area of brown soils the emphasis will be on the fullest possible use of grazing lands and water resources to carry the feeder cattle which will be finished on grain on other farms.

The general direction of change in the agriculture of the Prairie Provinces is, therefore, clear enough. There will be pressure to economize in the use of labour as long as the economy is prosperous and expanding. This will push the adjustment to larger farms and encourage mechanization in the fullest degree. On the specialized grain farms in the brown soil zones this will mean that a trend already well developed will continue to operate. On the black and grey-wooded soils, the adjustment to larger farms will be necessary also, but it will be counteracted by the tendency to intensify land use so that more livestock can be carried.



The changes outlined will be greatly influenced by the extent of the external market for wheat and the fluctuations in the yields of grains. The motivating factor for future changes in the farming of the Prairie Provinces is the domestic demand for livestock products. It is likely to rise at a rather slow and even rate, and slightly faster than the rate of increase in the population. Should the export markets for grain remain strong, the process of intensification of the black and grey-wooded soils is likely to be accelerated.

Land settlement will probably continue to add to the area occupied for farming in the Prairie region between now and 1980. Our expectation is that about 5.5 million acres will come into farms between 1951 and 1980; in the absence of any rational means of projecting a rate of settlement, it is assumed that as much land will be added before 1965 as between then and 1980. As the intensification of Prairie agriculture is not likely to become very pronounced until some time beyond 1965, it can be expected that adjustments in farm size and further economies in the use of labour will be more pronounced in the next ten years than afterwards. For this reason it seems likely that the number of farms in the Prairies may decline from 240,000 in 1951 to about 200,000 by 1965 but that, between then and 1980, the process of intensification will slow up the effects of consolidation, and the number may not fall much below 190,000 by that date. If this occurs, the average size of farm would increase from 478 acres in 1951 to about 600 acres in 1965, and to just under 700 acres by 1980.

A similar pattern can be expected in agricultural employment. In 1955 there were 334,000 workers on farms in the Prairie region, an average of approximately 1.4 workers per farm. By 1965 the number of workers may fall to 280,000, a decrease of 16%. This compares with a fall from 1946 to 1955 of 84,000, or a fall of 18% from the 1946 level. The result would be somewhat less than 1.3 workers per farm. By 1980, however, the demand for livestock might so increase the intensification process that the rate of displacement of labour would be very much slower. It is expected that the fall in number of workers on prairie farms between 1965 and 1980 will be very small and may not amount to more than 5,000 workers. This would mean that labour per farm might rise slightly. If such a reduction in the labour force occurs, agricultural employment would occupy the time of only 18% of the labour force in the Prairie Provinces by 1980 compared to 34% at the present time.

The capital invested in each farm will rise considerably. The process of mechanization will proceed farther, and the units of machinery being used at present will be replaced by bigger and more costly ones, as the trend toward larger farms continues. In addition there will be a considerable increase in the livestock inventory on many farms. Accompanying this

there will be more barns to house livestock, and more barn machinery to handle it. The use of electrically powered machine units will increase to provide many labour-saving devices in livestock production.

No forecast about the Prairie region would be complete without some reference to the considerable possibility of future production hazards such as drought. Crop failures may occur in the future and disturb the general trend, just as they have in the past. Farmers are much better prepared to meet them now, however, and the rapidity of cultivation by machine may lessen the hazard by making the best use of what suitable weather occurs in any one crop year. Moreover, governments are more alive now to the need for quick action when disaster strikes, and so, in the future, the rate at which economic progress will be slowed down as the result of crop failures may not be quite so great. It may mean that levels of grain carryover from year to year will have to be increased as the amount of livestock carried on farms increases, if disaster is to be avoided. While little mention has been made of such disasters in this chapter, it has not been because they are never to be expected again, but only because they are regarded as relatively short-run deviations from a trend which is likely to persist in spite of them.

## BRITISH COLUMBIA

THE CENSUS reports indicate that between 1911 and 1951 the occupied farming area of British Columbia increased from 2.5 million to 4.7 million acres and that the amount of land actually improved increased from 477,590 to 1,147,776 acres. In 1951 the occupied acreage constituted 2% and the improved acreage .5% of the total land area of the province. In addition to the area already improved it is estimated<sup>1</sup> that the province possesses some 4,615,000 acres of potentially arable land. Supplementing the arable area are large tracts of provincially owned grazing lands which currently supply summer pasture for cattle and sheep. These areas include 1,974,000 acres of open grassland and 15,500,000 acres of timber grazing land.<sup>2</sup>

The extremely rough topography of the province largely explains why the amount of arable land is so limited, why it consists of many widely separated segments of various sizes and shapes and why so much of it is located in river valleys and coastal plain areas. Of the present cultivated acreage nearly a fifth is in the Lower Fraser Valley, another fifth in the Peace River area, about 10% in the Okanagan Valley, 9% in the Kamloops and Lower Cariboo area, 6% to 7% in central British Columbia, 5% in the Vancouver Island and Gulf Islands area and much smaller percentages in the East and West Kootenay districts and two or three other regions.

### I. Type of Farming Developments

Various factors have helped to determine the use made of arable land. To a considerable extent the tremendous variation in the type of soil has been reflected in the kind of crops grown. Even more significant, however,

<sup>1</sup> "Inventory of Agriculture in British Columbia" by J.S. Allin in *Proceedings of Ninth British Columbia Natural Resources Conference*, Victoria, British Columbia.

<sup>2</sup> Address by W. McGillivray in *Proceedings of Second British Columbia Natural Resources Conference*, p. 72.

has been the influence of climate. In many parts of the southern interior, including sections of the Okanagan, East Kootenay, Similkameen and Thompson Valleys, the brown and dark brown grassland soils, though highly fertile, cannot be used for dryland farming because rainfall is far from sufficient. On the other hand such areas have exceptionally high temperatures and long frost-free periods. The result is that, when the land is irrigated, it is particularly valuable for producing sensitive crops such as peaches, apricots, cherries, apples, grapes and cantaloupes as well as various kinds of vegetables and alfalfa. Since, however, the amount of land that is particularly suited to this type of production is relatively scarce, it tends to be high priced. In order to justify the high land and irrigation costs it has been found absolutely necessary to choose a type of production such as that just indicated which will yield a high per acre income.

In the Fraser Valley or Lower Mainland and on the eastern and southeastern sections of Vancouver Island nearness to large urban markets has been a major factor in determining the nature of agricultural activity. While other factors, such as the particular nature of the soil and climate and the high price of the land, have helped to shape the course of development, the desirability of having bulky and perishable commodities produced close to market largely explains why these areas have tended to concentrate on dairy and poultry farming and on producing small fruits and vegetables and highly specialized horticultural items. On the other hand it is mainly because certain factors favourable to the raising of livestock by range methods occur throughout the southern Interior Plateau that cattle and sheep ranching has been the predominant form of land use in that region. These favourable factors have included the presence of enough open grassland or swamp meadow land to provide range in the spring and autumn, the existence of hay land, whether natural meadows or irrigated valley bottoms and terraces, to provide winter feed, access to government-owned forest range area during the summer months, short winters and light snowfalls which permit winter grazing and reduce the feeding period, reasonable proximity to shipping points and an adequate supply of watering places.<sup>2</sup>

An entirely different kind of farming has been developing in that part of the province which is referred to as central British Columbia and which runs in a general east-west direction from Prince George to Prince Rupert in the vicinity of the Canadian National Railway. Here the soils, which are mainly of the grey-wooded type, are badly leached and highly acid and, in general, have poor physical properties and low natural fertility. Before they will produce effectively they must be built up through the use of legumes, grasses and manure and this involves the adoption of a

<sup>2</sup> For a detailed discussion of the location and extent of the range area and the requirements for successful ranching see Thos. R. Weir, *Ranching in the Southern Interior Plateau of British Columbia*, Queens Printer, Ottawa, 1955.



general or mixed brand of farming which integrates the production of forage and feed grain with that of livestock and livestock products. This type of farming is also dictated by the general nature of the climate, which is sub-humid and cool, and also by the necessity of producing commodities which can be transported long distances to market at relatively low cost. For the most part the comments just made apply also to farming in the Peace River District. In the latter area, however, a less acid soil and a slightly cooler and drier climate have caused more emphasis to be placed on cereal production than in central British Columbia. It should also be noted that climatic conditions in both areas have favoured production of forage seed.

From the foregoing it will be evident that the agriculture of British Columbia has been very diversified and characterized by a pronounced degree of regional specialization. This becomes even more obvious when it is realized that almost 92% of the current tree fruit production takes place in the Okanagan Valley; that 85% of the small fruits are produced in the Lower Fraser Valley and a further 7% on Vancouver Island; that, of the total vegetable and potato production, 59% occurs in the Lower Fraser Valley, 18% in the Okanagan Valley and 16% on Vancouver Island; that Vancouver Island and the Lower Fraser Valley together produce 95% of the special horticultural items; that 70% of the province's grain is produced in the Peace River region; that the Lower Fraser Valley accounts for two-thirds, Vancouver Island 10% and the Okanagan region a further 10% of the dairy production; that the Lower Fraser Valley is responsible for two-thirds of the poultry and egg output, with Vancouver Island and the Okanagan being the next largest producing areas; that the Cariboo, Kamloops and Northern Okanagan districts in the Interior Plateau contribute 80% of the beef cattle while the central British Columbia and East Kootenay areas supply most of the remainder; that the Peace River and Lower Fraser Valley supply more than half the hogs; and that almost all the forage seed is produced in the Peace River District, central British Columbia and the Lower Fraser Valley.<sup>4</sup>

Some idea of the relative economic significance of the various farm enterprises may be obtained by noting the percentage of the total farm cash income which was derived from each in 1954. The records show that almost 30% of the income resulted from the sale of dairy products, 22% from the sale of poultry and eggs, 13.5% from the sale of beef cattle, 9% from vegetable and potato sales, 8.1% from the disposal of tree fruits, 4.6% from the sale of small fruits, 4.2% from grain sales, 3.9% from selling special horticultural products, 2.4% from selling hogs, and

<sup>4</sup> These percentages appear in "Inventory of Agriculture in British Columbia" which was presented by J.S. Allin at the Ninth (1956) British Columbia Natural Resources Conference.

that the forage, forage seed and sheep sales accounted for the remaining 2% or 3%. Of the total income 69% was derived from livestock and livestock products while crop sales accounted for the other 31%.<sup>2</sup>

## *II. Changes in the Number and Size of Farms*

The past half century has witnessed significant changes in both the number and size of British Columbia's farms. While the total number of farms was four times as large in 1951 as in 1901, nearly all of the increase occurred prior to the 1921 census. More important, however, is the fact that, whereas farms of almost all sizes have tended to become more numerous, the smaller farms have increased in number far more rapidly than the larger ones. During the 50-year period from 1901 to 1951, farms containing less than 100 acres increased eight times while those with a larger acreage failed to double in number. It may also be noted that, whereas the farms with less than 100 acres constituted only 41% of all farms at the earlier date, they made up no less than 74.4% of the total number in 1951. While all the smaller farms have become more numerous, those containing from 5 to 50 acres have increased at a particularly rapid rate. Farms of the 5 to 10 acre size were no less than 12 times as numerous in 1951 as in 1901, while those in the 11 to 50 acre category multiplied 11 times during the same period. On the other hand the number of farms containing between 100 and 300 acres, after increasing gradually until the end of the 1920's, has shown a definite tendency to fall. The decline in the number of quarter-section farms since 1941 has been particularly marked. In many cases they have been combined to form larger units while, in other instances, they have been subdivided to form smaller farms. As for the farms containing more than 300 acres, those with less than 480 acres have tended to remain fairly constant in number, while the number of those containing three-quarters of a section or more has shown a steady and fairly marked increase. Prior to the 1940's the average acreage per farm continued to increase since the additional acreage contained in the comparatively small number of newly established large farms was more than sufficient to offset the effect of increases in the number of small farms. More recently, however, the opposite has been true. Between 1941 and 1951 a slackening in the rate of increase of the larger farms combined with a definite increase in the number of very small farms caused the average acreage per farm to drop from 185 to 178 acres. The postwar years have seen a pronounced increase in the number of farms containing less than ten acres. Many of them have been established as part-time undertakings by war veterans and others in areas adjacent to Vancouver and other urban centres. In many cases, also, farms have been reduced to a size which would permit the owners to operate without the aid of hired labour.

<sup>2</sup> *Ibid.*

### III. Trends in Farming Methods

Between 1941 and 1951, a 40% increase in the physical volume of British Columbia's agricultural production was associated with a 25% increase in the improved land area, a decline of 18% in the farm labour force and an increase of 70% in the amount of other production factors. This indicates two things. The first is that the extra production was obtained partly by increasing the number of acres and partly by making more intensive use of each acre, that is, by combining the extensive and intensive methods of land use. The second is that the increased intensity was entirely the result of combining more and better capital in various concrete forms rather than labour with the land. Intensification has involved wholesale substitution of machines for men, increased applications of fertilizer, additional use of irrigation facilities, expanded purchases of livestock feeds, increased use of pesticides, insecticides and weedicides, more and better livestock and better seed. It may be noted, for example, that, between 1941 and 1951, the number of tractors increased from 2,696 to 13,148, the number of milking machines from 405 to 3,788, the number of combines from 60 to 687, and the number of electric motors from 2,244 to 6,661. Also, that, by 1954, 93% of the farms in the Lower Fraser Valley had milking machines, 92% had tractors and 79% had cars. In respect of irrigation the last census reports that, in 1950, there were no less than 138,382 acres of irrigated land on 6,249 farms, while provincial agricultural officials now (1956) estimate that the irrigated area has risen to 150,000 acres. Among other evidences of increasing intensity there is the fact that British Columbia farms now use about 60% more commercial fertilizer than they did 15 years ago and that provincial imports of feed grain have multiplied several times since the federal government freight assistance policy was inaugurated in 1941.

It is well to remember that, in many agricultural areas in British Columbia, farm lands have become distinctly high-priced. This means that they simply must be used with a relatively high degree of intensity if they are to continue in use at all. The significance of land values in this connection is well illustrated by data secured by those in charge of a recent study of dairy farming in the Lower Fraser Valley.<sup>6</sup> This information shows that improved farmland was valued at \$330 and unimproved land at \$139 per acre and also that 90% of the improved land was in pasture or used to produce hay, grain and silage. In view of this situation it is obvious that each acre of land would have to be cultivated quite intensively. This is likely to be still more true in future as farmland

<sup>6</sup> See article entitled "Some Economic Aspects of Farm Organization and Management on Dairy Farms of the Lower Fraser Valley, British Columbia 1953", by C. H. Ferris in the *Economic Annalist*, April, 1955.

values are raised still higher by the competitive bidding of non-agricultural users.

In view of what has already been said it seems scarcely necessary to emphasize the fact that much of British Columbia's agriculture has developed along specialized lines. Apart from the regional specialization already indicated, a lot of the farming is specialized in the sense that farmers tend to concentrate on a single enterprise. Moreover, there is specialization in the sense that special emphasis is placed on the production of those products for which the resources of the province are best fitted. In particular an attempt has been made to take full advantage of the climatic conditions by producing tree and small fruits, vegetables and forage seed and special horticultural products. There has also been a general tendency to produce commodities like whole milk and poultry and eggs which, because of their bulky or perishable nature, are subject to high transportation costs. These encourage production close to market and provide a large measure of natural protection against outside competition. On the other hand much less emphasis is placed on producing things such as butter, cheese, beef, pork or feed grains which are much more transportable and which can ordinarily be produced more efficiently in other provinces because of lower priced land, a topography more favourable to mechanization, the ability to operate on a larger scale, etc.

#### *IV. The Future Prospects*

As already noted the agricultural production increases of more recent years have been much more the result of using the existing arable acreage more intensively than of adding to that acreage. There are several reasons for this. A major one is that it has been possible to get far more extra product from a given expenditure on capital goods such as fertilizer, spray materials or machinery than from an equal amount spent on buying more land. This has been particularly true in British Columbia, where extremely high land prices have recently prevailed in some of the more developed agricultural areas. A second reason is that it has usually been possible to obtain the added product more quickly by combining more capital with the existing area than by adding to that area. Any land added has normally had to be cleared or otherwise reclaimed, and this has been time consuming. In the third place it has often been physically impossible to secure suitable land in locations where it could be used effectively.

When this past experience is combined with the knowledge that all the best and most easily cleared land in southern British Columbia has already been taken up, it seems logical to conclude that the tendency to expand production by making intensive rather than extensive use of land will be even more pronounced in the future than in the past. This, however, will not be true of areas such as the Peace River District, which are at



an earlier stage of development, which can never have the benefits of irrigation, which have land that can be cleared more quickly and cheaply than much of that further south, which are suited only for a type of mixed farming that requires a fairly extensive area for efficient operation and which have land that is too low in net productivity to warrant intensive cultivation.

In line with this reasoning, and assuming no additional assistance from governments in land clearing, etc., we anticipate a definite but gradual expansion in the cultivated area in seven of the ten districts of the province during the next quarter century, a more pronounced increase in the central British Columbia mixed farming area, at least a doubling of the present area in the Peace River District and a very distinct reduction in the important Lower Fraser Valley. While it is obvious that the amount of new land development in specific districts will depend on many things, including the number and location of new industries and the provision of improved transportation facilities, it is hardly to be expected that the improved land area will be more than three or four hundred thousand acres larger in 1980 than at present. This amount will thus be only a small part of the 4,615,000 acres which, it is currently estimated, could be added to the present arable acreage of British Columbia if it were absolutely necessary.

Even though 27% of British Columbia's farmers are already making some use of irrigation, and while recent years have seen an increased use of fertilizer, more intensive feeding of dairy cattle and poultry, more spraying in connection with the fruit and vegetable enterprises, some expansion in the use of chemical weed destroyers, etc., intensification possibilities are still quite pronounced. While intensification will take a variety of forms, increased use of irrigation water, fertilizers, and chemical weed killers will be particularly important. While the amount of irrigation will depend to a considerable degree on the extent, if any, to which the capital cost of undertaking irrigation schemes is incurred by governments, the fact is that a steadily increasing number of farmers have found in recent years that it definitely paid them to install their own systems. In view of this experience one would expect that irrigated acreage will rapidly increase, especially in areas where land costs are particularly high and where the irrigation water can be made available at relatively low cost. Many such areas are said to exist in the agricultural sections of the Fraser Valley and Vancouver Island as well as elsewhere. Thus far only about 8,000 acres of the Fraser Valley and 1,200 acres on Vancouver Island have been irrigated.<sup>7</sup> As for fertilizer usage, provincial soil specialists

<sup>7</sup> G.R. Webster, "Trends in Irrigation in the Southern Coastal Area of British Columbia", in *Proceedings of Sixth British Columbia Natural Resources Conference*, 1953, pp. 49-51.

have recently stated<sup>8</sup> that proper use of the present fertilizer consumption would increase crop production substantially and that there are many parts of the province where fertilizer consumption could be doubled to advantage. This suggests that much more fertilizer will be used even though no rise in farm product prices occurs. Any increase in these prices will naturally encourage still further use.

Increased amounts of many other capital items are certain to be combined with the land. The list includes vaccines for use in the treatment of poultry and dairy cattle diseases; tractors, milking machines, sprayers, dairy and poultry buildings designed to speed up work and save labour; and chemical sprays for killing weeds and insects, thinning tree fruits and preventing pre-harvest dropping of apples. Besides causing a larger total and per acre output, the addition of such agents will result in more product per man and per animal unit.

Apart from the extra production which will result from using more land and using all land more intensively, a further and very significant amount may be expected from the prospective advances in agricultural technology. Estimates based upon agricultural progress in both Canada and the United States during the first half of this century indicate that an average gain in productivity of 2% per man per year has resulted from technical improvements. In the light of this record and the nature and scale of the current plans for agricultural technological research, it seems reasonable to assume that future productivity gains resulting from advances in technical methods will at least equal those of the past.

Future production is likely to be still further increased because of improvements in the organization and management of the individual farms. A minority of farms which are well organized and managed usually account for a far larger aggregate product than the great majority which, for various reasons, are less well organized and managed. The current tendency to increase farm management extension activity, the probability that continued existence of alternative opportunities will facilitate the exit from farming and thus permit the absorption of many small and poorly organized farms into more efficient units, and the increasing extent to which farmers are under economic pressure to increase operating efficiency all suggest that definite improvements in organization and management may be anticipated, together with the production increases resulting therefrom.

While the combined effect of the four factors just discussed will be a steady and sizable production expansion, the actual extent of the increase will vary with the special circumstances relating to production of the individual commodities. In regard to milk production a steadily larger

<sup>8</sup> See, for example, H.F. Fletcher, "Trends in Fertilizer Practices in British Columbia" in *Proceedings of Sixth British Columbia Natural Resources Conference, 1953*, pp. 51-53.

part of the land heretofore used for dairying in the Lower Fraser Valley will be transferred to non-agricultural uses. Some 14,000 acres have already been lost to farming and it is estimated that the next 25 years will see a further transference of something like 40,000 acres.<sup>9</sup> In view of the expected expansion in consumption requirements, the reduction in the present producing area will necessitate more intensive production on the remaining acreage as well as production in one or two limited and hitherto untapped interior districts such as Pemberton Meadows. Despite any extra production obtained in these ways, the general result is likely to be that a steadily larger percentage of all milk produced will be needed for fluid consumption, that the so-called surplus problem will become less serious and will probably have disappeared well before 1980 and that a steadily larger part of the requirements for processed products such as butter and cheese will have to be imported from other provinces. The increased butter production which will accompany expansions of mixed farming in the central British Columbia and Peace River districts will be far from sufficient to meet the growing consumption requirements.

As for beef production, any increases are likely to be relatively slight in comparison with the expanding consumption requirements. No extra production need be expected from the range areas unless special steps are taken to provide the irrigation needed to ensure winter feed supplies in certain areas. Indeed it may well be that a gradual encroachment of other types of farming will gradually reduce the present range acreage and bring about an actual reduction in the range beef supplies. Another factor which may tend to reduce beef production is the growing demand for an animal that is grain-finished and of the size from which small cuts may be obtained. To supply this would probably necessitate the establishment of specially located feeding centres as well as increased feed grain imports. On the other hand some increase in beef production may be expected to result from the gradual extension of mixed farming in the Peace River and central British Columbia district. Any such increase, however, will meet only a small part of the anticipated expansion in demand. Whereas, at present, British Columbia is dependent on other provinces for about 70% of her beef requirements, it may well be that, by 1980, well over 90% of the beef required may have to come from outside the province.

Hog production, which at present supplies only about 10% of the province's pork requirements, will probably increase as development of additional acreage in the Peace River and central British Columbia sections

<sup>9</sup> See *Report of British Columbia Royal Commission on Milk, 1954-55*, pp. 16-21. Note also that, in response to a special enquiry made by the Central Office of the Agricultural Institute of Canada in Sept., 1955, leading British Columbia agricultural officials reported that 20,000 acres of good land had gone out of agricultural production in the previous 15 years. The estimate re future losses was made by the committee responsible for the agricultural brief which was presented to this Commission.



causes more production of feed grain. A still further increase may accompany the gradual shift from wheat to barley and oats which is expected to occur in the Peace River area. Total increases, however, are unlikely to be sufficient to meet more than a quarter of the province's additional needs for pork. It should also be remembered that, unless the Pacific Great Eastern Railway is extended to the Peace River, all hogs produced in that district will continue to go to Edmonton rather than Vancouver.

Until very recent years production of eggs and poultry meat was usually large enough to satisfy requirements of the province's consumers. Indeed there were times when egg production was in excess of consumption. At certain seasons, however, it has been impossible for British Columbia's producers, who have had to rely on purchased imported feed, to compete against Alberta farmers, who produced merely as a sideline and during the season when abundant supplies of home-grown grain were available. During very recent years poultry and egg production has increased but at a slower rate than the provincial consumption requirements. At present provincial production meets only 80% of these requirements and, in 1955, no fewer than 2,000,000 pounds of poultry meat were imported, much of it from the United States. There is every evidence that production will increase during the next quarter century but at very different rates in different areas. The increase may not be more than 10% or 15% in areas close to major urban centres. On the other hand it may well be 100% in central British Columbia and the Peace River. But, since the poultry enterprise will normally form an integral part of a mixed farm programme in these latter areas, farm flocks will be relatively small and the aggregate production increase correspondingly limited. In general the rate of production increase for the entire province will probably lag behind that of the population, with the result that around 40% of the supplies required by 1980 will have to be imported. The great bulk of aggregate production will be concentrated in the Fraser and Okanagan Valleys and on Vancouver Island.

As for crop production a gradual increase in the feed grain output may be looked for partly because of an expansion of farming in the Prince George, Peace River and other districts and partly because of a shift from wheat to feed grain production. Mainly because the areas suitable for producing high yields of good quality fruit are limited, there is not likely to be any marked expansion in tree fruit production. Since, however, these fruits are presently produced greatly in excess of local demands, production 25 years hence should still be more than ample for market requirements. As for small fruits and vegetables, there is little doubt that a large production expansion will occur. If wage rates in British Columbia fruit and vegetable processing plants continue much above those in eastern Canadian plants, much of the canned fruit and vegetables consumed in British Columbia will continue to be brought from eastern Canadian points.



British Columbia's vegetable production may also be somewhat curtailed because of the inability to lower costs to levels corresponding to those in recently developed producing areas in the State of Washington and southwestern Alberta. In this connection much depends on what, if anything, is done to eliminate the competitive advantage which producers in these areas now apparently possess. Despite any limiting factors such as those just mentioned, however, we would anticipate that future expansion of small fruit and vegetable production in British Columbia will tend to be quite pronounced.

By way of summary one may say that, despite increases within her own borders, British Columbia is destined to become even more dependent than in the past on other parts of Canada for meats and processed dairy products. Current technological developments plus rapidly rising land values will make it increasingly difficult for her producers to meet outside competition. Moreover, even though British Columbia increases her output of all products to some extent, the rise in her land values will tend to bring about a relative decline in general agriculture or mixed farming and a corresponding increase in output of products like small fruits, vegetables and poultry, which yield a large income per acre. This, of course, will be particularly true in those districts where the rise in land values is most pronounced.



**PART III**  
**MARKETING AND INCOMES**





## TRENDS IN MARKETING

DURING the latter part of the 18th and throughout most of the 19th century public regulation of economic activity in the Western world was distinctly limited. Economic freedom of action was favoured during the period, partly because of a widespread desire to avoid the complications and extreme restrictionism which had characterized economic life in the 16th, 17th and early 18th centuries, but mainly because of a general belief in the inherent superiority of an economic system based on the *laissez-faire* idea. The general contention was that the more individuals were left free to seek their own economic interests, the more their actions would contribute to the economic well-being of society. Special governmental regulation was held to be unnecessary since economic life was certain to be regulated automatically and in the most efficient possible manner as competition among the profit-seeking individuals and firms took place. Competition among the participants was supposed to guarantee fair prices and maximum efficiency in production and distribution.

The whole case for this unregulated type of economy was based on the assumption that competition would be atomistic, that is, that each commodity or service would be produced or performed by a large number of separate and relatively small-scale operators. This appears to have been a justifiable assumption during the last quarter of the 18th century and for some considerable time thereafter. Gradually, however, the constant striving for increased efficiency as a means to added profits led to changes in the physical and financial organization with the result that, by the end of the last century, the assumption had lost a good deal of its validity. The nature of the changes varied greatly in different economic groups, being conditioned largely by the type of activity undertaken.

Broadly speaking, the manufacturing and commercial service industries found that the secret of added efficiency lay in intensive specialization, mechanization, standardization and operation on a large-scale basis. Large-

scale operation meant that the total demand for any particular commodity or service could be met by a small number of concerns. The number needed became less as the scale of operations increased. On the other hand there were other types of activity, of which agricultural production was the most important, which proved technically unsuited for operation on a really large scale. In such industries increasing efficiency was accompanied by the retention of large numbers of relatively small-scale operators.

From the farmer's standpoint these differences in the nature of economic development had two important results. In the first place the growing divergence between the scale of operation of farmers and those who purchased their products caused a steady and pronounced decline in the farmer's bargaining power. In the second place the replacement of many small marketing concerns by one or two or a very few large ones made it less certain that there would be active competition between marketing agencies or that savings obtained through increased marketing efficiency would be passed on to farmers in the form of higher prices.

The problem presented by this state of affairs was how to arrange things so that the prices which farmers received would not be lowered by declines in farmer bargaining power or by lack of price competition on the part of those who bought farm products. While several methods of attacking the problem have been attempted or suggested they all require combined action. Any attempt at finding a solution involves the making of a choice between two general lines of approach. Either the farmers who feel that they are not receiving adequate prices must seek price improvement through co-operative action, or the government must seek this improvement on their behalf through some form of state action. In what follows we shall be concerned with the general nature of the steps that have been or may yet be taken in connection with this matter.

### *I. The Trend toward Voluntary Co-operation*

Since the latter part of the last century Canadian farmers have sought increased selling prices through joint action of various kinds. For the first several decades their co-operative efforts were entirely voluntary in character. In practice the actual form of co-operation varied in accordance with the special nature of the circumstances or the specific objective of the co-operators. Where the main aim was to get better price terms through increasing bargaining power, the farmers formed a voluntary co-operative organization for the express purpose of negotiating prices and other conditions of sale. In such cases no attempt was made to perform any of the remaining marketing functions. This type of co-operation is well exemplified by the whole milk producer associations which endeavoured to arrange annual or semi-annual gentlemen's agreements with the representatives of the milk distributor organizations. Where, however, it was not feasible to bargain collectively and where it was felt that lack of competition among

buyers was resulting in unduly low price offers, co-operation took the form of direct participation. The purpose here was to use co-operation to supply the competition which was assumed to have disappeared and thereby to replace monopolistic prices by competitive ones. In all such cases the voluntary co-operatives were intended to provide co-operative competition and to act as pacemakers for the private firms.

Co-operative marketing of the type and for the purpose just described was gradually introduced in all parts of Canada and for virtually all farm products. The movement first took concrete form in the 1870's when farmers began organizing and operating cheese factories and creameries. While these represented joint action for mutual benefit, they were rather loosely formed and unincorporated. By degrees, however, as organization took on a more permanent character, efforts were made to have the newly formed co-operatives or "companies" incorporated under the general company laws of the provinces. For about a decade before and after 1900 many co-operatives were incorporated in this way. Since, however, the ordinary company laws did not provide for payment of patronage dividends, limitation of returns to capital and restriction of voting privileges, they were not altogether suitable for the incorporation of associations which were intended to operate in accordance with co-operative principles. Moreover, the cost of incorporating under a companies act was more than many small groups of farmers could afford. Because of these limitations special co-operative legislation was gradually enacted. Such legislation, which permitted incorporation at only nominal cost, was introduced in Nova Scotia in 1908, in Quebec in 1909, in British Columbia in 1911 and in Saskatchewan in 1913. For many years past it has existed in all provinces. Indeed the statutes of some provinces contain several co-operative acts.

While the first co-operatives were purely local in character, actual experience soon convinced the farmers that significant benefits could not be obtained unless the area and scale of operations were extended. When, for example, the grain growers of western Canada found that they could not compete effectively against the private line elevator companies by forming co-operative single-unit farmer-owned-and-operated country elevators, they decided to establish a co-operative commission company to act as a sales agency on the central market at Winnipeg. This, it was thought, would permit farmers to keep control of their grain until their own commission company had disposed of it. While the plan proved effective it was soon obvious that without the complement of farmer-owned country elevators the commission company could receive only a limited amount of grain to sell. Necessity, therefore, prompted the next development, namely, the formation of farmer co-operative line elevator companies modelled after those of the private trade. Thus, formation of local co-operative elevators shortly after the turn of the century was followed by establishment of the commission selling agency, the Grain Growers Grain Company, in



1906 and this, in turn, was supplemented by the development of province-wide line elevator companies, the Saskatchewan Co-operative Elevator Company in 1911 and the Alberta Farmers Co-operative Elevator Company in 1913.

In Ontario the provincial Department of Agriculture had actively sponsored the formation of farmers' clubs during the first decade of the century. These clubs, which numbered several hundred by 1913, were more concerned with improving the technical methods of farm production than with participation in marketing or other economic activities. Partly because they were subject to government sponsorship and regulation, and partly because it was felt that each club acting in isolation was powerless to deal effectively with marketing and general economic problems, the United Farmers' Co-operative Company was formed in 1914. Its purpose was to free the clubs from political sponsorship and regulation and to provide a means whereby they could associate not only with one another but with all other local co-operative associations in the province in undertaking marketing and other economic activities. This company, now known as the United Co-operative of Ontario, has steadily expanded its scale of operations and now performs co-operative wholesale functions for about 150 local affiliates.

A similar development took place in Quebec in 1922 when the local co-operatives federated to form La Coopérative Fédérée de Québec. This organization has shown continuous and rapid growth and is now the central or provincial wholesale of 465 local co-operatives with a farmer membership of 45,000. Its present marketing facilities include three abattoirs, two stations for receiving slaughtered animals, a central livestock selling agency, two poultry processing plants, three egg receiving and grading centres, a grain elevator, a plant for manufacturing butter and cheese boxes and cold storage and warehouse facilities.

In certain cases where specialized production was largely concentrated in particular areas, co-operative organization tended to develop on a regional rather than a provincial basis. The United Fruit Companies of Nova Scotia formed in 1912 by the apple growers in the Annapolis Valley and the Okanagan United Growers of British Columbia formed in 1913 by the tree fruit producers in the Okanagan Valley exemplify this type of organization. In a few important instances, also, the desire to obtain additional economies of scale or additional ability to bargain or influence price has resulted in interprovincial or even national organization. The provincial grain marketing companies of Manitoba and Alberta amalgamated to form the United Grain Growers in 1917, while the three provincial wheat pools united to form a single selling agency known as the Canadian Co-operative Wheat Producers, Limited, in 1924. Maritime Co-operatives, Limited, with headquarters at Moncton, is a further and more recent example of interprovincial co-operation. This organization



acts as a wholesale co-operative for the entire Maritime area. Organization on a national basis was achieved in 1918 when the Canadian Co-operative Wool Growers was formed with branches in all provinces. The great bulk of the Canadian wool output has been marketed through this agency since that time.

A general idea of the rate of growth and relative importance of voluntary co-operative marketing may be obtained by noting that the co-operative share of agricultural marketing has been approximately a third in recent years. Moreover, the fact that this share has risen 8% or 9% since 1940 indicates an increased rather than a decreased reliance on this type of co-operative activity. There is, however, a wide variation in the amounts of individual commodities which are marketed co-operatively. In the 1953-54 marketing year something like 55% of the grain, hay and seed went through a co-operative at some stage of the marketing process as compared with slightly over 22% of the dairy products, 15% of the livestock, 9% of the poultry and eggs, 28% of the fruits and vegetables, 85% of the wool, 36% of the maple products, 90% of the tobacco and just under 35% of the honey.<sup>1</sup>

It is important to note that in establishing co-operatives farmers received a lot of governmental assistance. From the beginning governments assisted by passing co-operative legislation and, in many cases, by making grants and loans. In some cases government officials did organizational work and in certain instances government departments undertook to demonstrate the possibilities of effecting improvements in marketing until such time as the co-operatives were ready to do so. Other forms of assistance included the provision of storage facilities, processing plants and improved transportation. While the provincial governments were particularly active in providing assistance, a great deal of help was also given by the federal Department of Agriculture. This included active sponsorship of co-operative organization as well as help in the more concrete form of financial assistance. In the late 1890's, for example, grants were made to facilitate the organization of several co-operative creameries. Somewhat later the organization of poultry marketing co-operatives was given special encouragement. Similar help was given in the establishment of livestock marketing associations. Still further evidence of the special interest of the federal Department is found in the establishment in 1929 of a branch of the Department to deal with "farm economics including agricultural co-operative marketing".

While there were several reasons for this governmental support, there seems little doubt that it reflected in considerable measure government concern regarding the increasing difficulty of finding satisfactory markets which accompanied the steady increase in agricultural productive

<sup>1</sup> *Co-operation in Canada, 1954*, Economics Division, Canada Department of Agriculture, p. 9.

capacity. Government support of co-operative marketing was really part of a general policy which aimed at expanding markets by improving marketing methods. It was this same concern about finding markets which led to the establishment of a market research and intelligence service, a trade representative system and the special attempts at quality improvement. The latter included early attempts to select and grade products on a voluntary basis and later action which called for compulsory grading, inspection and certification.

## *II. The Trend toward Regulation and Control*

Farmers learned a great deal from actual experience with voluntary co-operation. For example, they learned that, unless a particular type of activity happened to be in an expanding stage or unless the co-operative took over an existing plant to avoid adding to the number of plants in operation, there was a real danger that any gains resulting from price competition would be offset by a loss of operating efficiency. It became apparent that where there was only so much business to be done, an extra plant could not be added without increasing the overhead cost per unit of all plants and that this increase in cost would tend to eliminate possibilities of price increases irrespective of the degree of competition. They also learned that marketing efficiency could only be attained if the functions were performed on a specialized and large-scale basis and that a large scale was often only possible if competition was pretty well eliminated.

Among those who learned these lessons were the fruit growers of the Okanagan Valley. As already indicated they had formed the Okanagan United Growers Co-operative in 1913 in the hope of increasing their bargaining power and hence their selling prices. While this organization functioned fairly well for a few years, it soon suffered losses in membership and effectiveness. By the start of the 1920's production had greatly expanded and it was becoming increasingly difficult to find good markets. As a result prices began to fall. As prices fell, more and more growers withdrew from the co-operative and started selling independently. This process soon led to completely destructive competition and ruinously low prices.

To improve this general situation the co-operative was reorganized and replaced in 1923 by a new large selling co-operative known as the Associated Growers Limited. While membership was purely voluntary, those who joined had to sign contracts agreeing to market their produce through the organization. It was hoped that the new co-operative, by getting control of the greater part of the product, would be able to secure a higher average price and a greater measure of price stability. The higher and more stable prices were expected to result from increased bargaining power, from balancing supply and demand more evenly throughout the

year and from expanding the market by means of an advertising, quality improvement and product differentiation programme. The extra ability to bargain, in turn, as well as the ability to carry out orderly marketing and market expansion programmes, was expected to vary directly with the percentage of the product which farmers had contracted to sell through the co-operative.

Actual experience showed that the ability to attain the desired objectives declined with each succeeding year. When the co-operative stored fruit in order to market it during a later part of the year it thereby reduced the supplies going on the market in the early fall months. The reduced supplies caused prices to rise and provided the non-co-operators with a wonderful opportunity to sell their product at high prices right after harvest and in nearby market centres while avoiding the cost of building cold storage plants and storing fruit as well as the cost of developing more distant markets. Thus the producers who obtained the greatest advantage from the activities of the co-operative were those who refused to join it. As this became evident and as the storage policy of the co-operative caused immediate market prices to rise, a steadily increasing number of co-operative members started selling independently, thereby breaking their contracts. As a result the part of the total output controlled by the co-operative dropped gradually from 85 to 70%. Since each drop in the percentage controlled reduced the possibilities of achieving the general objectives of the organization, and since the contracts were unenforceable, the growers gradually concluded that they could never hope to gain very much from voluntary co-operation. In their view what was needed was legislation which would permit 100% control of the product.

Continuation of low and erratic prices caused the demand for such legislation to grow with the result that, in 1927, the provincial legislature passed The Produce Marketing Act. This Act provided for the setting up of a Committee of Direction which was given power to regulate the time and place of marketing, the quality and quantity marketed and to set prices. The Act also provided for the collection of a levy to cover operating costs and to set up an equalization fund. The Committee functioned for five years and was reasonably successful in preventing flooded markets and price declines. In 1931, however, the legislation was declared *ultra vires* on the ground that it sought to regulate interprovincial trade and that the levy constituted an indirect tax.

In the meantime the dairy farmers of the Lower Mainland had been pressing for similar legislation. A Royal Commission was appointed in 1928 to study the milk production and distribution situation and its report, presented early in 1929, supported the idea of pooling and of regulated competition. Following presentation of this report the legislature passed an Act for the Relief of Dairy Farmers, 1929. The purpose of



this Act was to spread the difference between fluid and manufactured milk prices over all milk producers in the Vancouver milkshed. In other words, it aimed to give all producers in the area an equal price for all milk of equal grade and quality. Its main provision related to the making of levies for equalization purposes and for paying operating expenses. After operating until 1932 the Act was declared *ultra vires* on the ground that the levies collected were indirect taxes and hence outside the taxing authority of provincial governments.

Following this experience with provincial legislation the British Columbia producers naturally turned to the federal government for legislative assistance. About this time, also, Canadian farmers generally, having been subjected to declining incomes for many years and particularly from the onset of the depression in 1929, were searching for some means of preventing their incomes from falling. Moreover, partly because of the large amount of consolidation which had occurred in Canadian food products industries during the 1920's, farmers were coming to believe that their low prices and incomes were partly due to reductions in the number of buyers for their products. There was the further fact that farmers in various parts of Australia had been given legal authority to control marketing and were making considerable use of this authority and that legislation for this purpose had been introduced in Great Britain in 1931 and 1933. For these and other reasons producers from several Canadian provinces pressed for federal marketing legislation. The result was the passage of the Natural Products Marketing Act in 1934. This Act, which applied to interprovincial and export trade, provided for establishment of a Dominion Marketing Board with authority to exercise the powers embodied in the legislation and to delegate these powers to local boards, which were charged with actual administration of marketing schemes. The local boards were empowered to regulate the time and place at which and to designate the agency through which a product could be marketed; to determine the method of distribution and the quantity and quality of the product to be marketed; to establish pools; and to levy licence and equalization fees on processors and farmers.

No less than 22 schemes were approved under the Act between July, 1934, and December, 1935, and all but three of these were actually put into operation. However, in November, 1935, the validity of the legislation was challenged by a reference to the Supreme Court of Canada and in June, 1936, it was declared *ultra vires* on the ground that the Canadian Constitution did not empower the federal government to regulate trade within a province. An appeal to the Privy Council resulted in confirmation of this opinion in a judgment delivered in January, 1937. In order that schemes concerned with purely provincial trading could continue operating, several provinces passed provincial legislation patterned after the Natural Products Marketing Act. Indeed British Columbia.



anticipating the Supreme Court's decision, had passed the British Columbia Natural Products Marketing Act in June, 1936. In 1937 Ontario passed the Farm Products Control Act and New Brunswick the Natural Products Control Act. Since then all other provinces have passed similar legislation. Such action was taken in Prince Edward Island and Manitoba in 1940, in Saskatchewan in 1945, in Nova Scotia in 1946, in Newfoundland in 1949, in Alberta in 1955 and in Quebec in 1956. To supplement this provincial legislation the federal government, after repeated requests from the Canadian Federation of Agriculture and after exercising extensive control over the marketing of farm products for several years under the War Measures Act, passed the Federal Agricultural Products Marketing Act in 1949. Its purpose was to enable local boards operating within the provinces to exercise the same powers outside their respective provinces that provincial legislation permitted them to exercise within the provinces.

While the provincial marketing laws vary considerably in respect to the powers delegated to the provincial boards, the products eligible for control, the method of establishing local boards, and the specific powers granted to the local boards, they all have the same general objective, namely, the raising of farm prices and incomes by undertaking special types of control in connection with the marketing of farm products. Thus far the specific manner in which and the extent to which boards have tried to exert control has varied widely. Most of the Ontario boards have confined their activities to securing whatever benefits collective bargaining may bring when negotiating annual minimum prices, terms of purchase and sale, and standards of quality. In some cases, however, price negotiating committees have been either supplemented or replaced by agencies which supervise selling and collection and distribution of the proceeds. The most complete control over marketing is exercised by the three British Columbia boards. There the aim has been to raise prices by stressing more orderly marketing, by obtaining all possible economies of scale in the performance of the several marketing functions, by practising product differentiation and by expanding the market through advertising. Generally speaking, the actual nature and extent of control exercised by marketing boards has depended and will presumably continue to depend on many things, including the number and location of producers, the nature of the products, the nature of and distance from the market, the views of producers regarding established marketing systems and methods, the general level of market prices and the nature, extent and financial strength of the marketing agencies which have become established under the free market system.

While all provinces are now provided with marketing legislation which permits the will of a specified majority (usually two-thirds) of producers to be exerted over the dissenting minority, comparatively little use has thus far been made of it outside of Ontario and British Columbia.

Even in these provinces it has been applied mainly in connection with products which were produced in limited areas and by relatively small numbers of highly specialized producers. In general, experience to date would indicate that in the future as in the past the actual nature and scope of operation is likely to be closely related to the practical possibilities of enforcing the regulations. It is significant that the only programmes so far developed in the Prairie Provinces have been those relating to the marketing of honey in Manitoba and Saskatchewan.

In connection with Quebec it is interesting to note that the legislation recently enacted in that province differs in some important respects from that of all the other provinces. For example, the four-man board charged with general supervision of the act is to be appointed by the provincial cabinet for a minimum of ten years and is to determine in each individual case the actual powers to be delegated to local boards. Further, the act is distinctive in that it specifically safeguards the continued existence of voluntary co-operatives. Where such a co-operative is already handling a product which is to be subjected to market regulation, the act requires that it be named as the agency of the local board. In fact it is explicitly stated that the act is regarded as being a supplement to rather than a substitute for existing voluntary co-operative marketing. In this connection it has been stated<sup>2</sup> that the regulated or compulsory co-operative type of marketing under discussion here is midway between state marketing and purely voluntary co-operative marketing.

At the present time Canadian producers who are interested in regulated marketing of the type described above are anxiously awaiting the judgment of the Supreme Court of Canada relative to the constitutionality of the various sections of the Ontario Farm Products Control Act. This legislation was referred to the Court several months ago after the Ontario Hog Marketing Board's authority to make deductions from hog receipts was challenged. Since a legal decision had to be obtained on this point it was thought desirable to obtain a final ruling regarding the legality of all sections of the Act.

### *III. The Trend toward State or Government Marketing*

Apart from the programme undertaken during the two world war periods, direct and regular participation by Canadian governments in agricultural marketing has developed only for fluid milk and wheat. Prior to 1933 or 1934 the prices obtained for milk were the result of voluntary negotiation between representatives of producer and distributor organizations. By 1933, however, the prices paid at cheese factories and creameries fell so low that farmers who normally catered to these outlets attempted to secure a higher price by offering milk to fluid milk consumers at prices

<sup>2</sup> Canadian Federation of Agriculture, *Report on Marketing Conference*, p. 1, Ottawa, Feb. 26, 1947 (mimeo.).

somewhat lower than those specified in the agreements between distributors and the regular producers. This additional milk was sold by a new crop of distributors and usually in unpasteurized form to consumers whose purchasing power was low because of wage reductions and unemployment. The result was that the volume of business of regular distributors declined, buying and selling prices lost all semblance of constancy and the voluntary price agreements became entirely unenforceable. In these circumstances regular producers and distributors appealed to their respective governments to bring order out of chaos by establishing producer and consumer prices, controlling the number and kind of distributors and exercising general supervisory powers.

These appeals plus a general concern about the maintenance of sufficient supplies of milk of high quality led to the passage of milk control acts in several provinces in the mid-thirties. The situation was regarded as serious and the legislation was looked upon as emergency legislation. In general the acts provided for boards with power to investigate marketing practices, fix and enforce producer and consumer prices, limit the number of distributors and, in general, regulate milk marketing. In practice the boards have been chiefly concerned with setting prices and licensing and bonding distributors. To a lesser extent they have been concerned with testing milk in distributing plants, regulating rates charged for transporting milk from the farms and investigating the possibilities of reducing distributing spreads. It is important to note that this type of participation has called for the regulation of existing marketing agencies and methods rather than for an attempt to perform the actual marketing functions on a public utility basis as has been done in a few places including one or two New Zealand cities.

Though the boards were created to deal with an emergency situation they have continued to operate, chiefly because producers have virtually insisted on the maintenance of governmental assistance in setting prices. They have felt that, without this help, their ability to bargain relative to that of the distributors would steadily diminish in view of the tendency of the latter to become concentrated in larger units. Since the producers are likely to continue to feel the need of bargaining assistance, there is every prospect that the marketing boards will remain in existence. On the other hand, there is little indication that the nature of their activities will vary much from those of the present.

In the case of wheat it may be said that so far as most western producers were concerned the trend toward government control of marketing as represented by the present Canadian Wheat Board began with establishment of the Board of Grain Supervisors to handle the 1917 and 1918 crops and the first Canadian Wheat Board to market the 1919 crop. From 1920 to 1923 producers continued to press for re-establishment of the Wheat Board and it was only when the impossibility of



achieving this objective became obvious that they organized the voluntary contract wheat pool system in 1923 and 1924. By the late 1920's, if not earlier, many producers had come to regard the voluntary co-operative pooling system as an imperfect substitute for a single compulsory pool sanctioned by legislation and operated either by the producers or, preferably, by the government as in 1919-20. From the time that collapse in wheat prices, which began in 1929, forced the wheat pools to seek financial guarantees from the provincial and later the federal government, producer advocacy of some form of monopolized marketing became increasingly insistent. This producer attitude plus the continuation of low wheat prices and the consequent need for wholesale governmental intervention along price stabilization lines was largely responsible for the federal government's decision to establish a government board as an optional marketing outlet in 1935. This, it was felt, would free producers from depending upon the open market system without interfering with it in any way. Operation of the board was combined with payment of a minimum guaranteed price which varied from year to year. While the board naturally marketed little grain at times when the open market price exceeded the guaranteed minimum price, its undertaking of the marketing at other times provided producers with a considerable amount of price insurance. After operating on this basis from 1935 to 1943 the government, for various reasons, announced its decision to undertake the marketing of wheat on a state monopoly basis. As a result all western Canadian wheat has been marketed through the Canadian Wheat Board since September, 1943. At present there is nothing to indicate that the future will see any fundamental change in existing arrangements. Moreover, past experience suggests that irrespective of the form which governmental participation may take, its degree will remain pronounced.

#### *IV. Development and Operation of the General Price Support Programme*

Prior to World War II the emergency measures taken in respect of wheat prices constituted the nearest approach to a government policy aimed at preventing undue declines in prices of farm products. Special consideration was given to the wheat price problem because the pronounced degree of specialization in wheat production made it impossible for many farmers to spread the risk of price changes, because the extremely inelastic nature of the demand for wheat made it particularly susceptible to sudden and pronounced price declines and because wheat production was in many ways the most exposed and unstable of all agricultural activities. Moreover, it was realized that a really low price of wheat, if continued, was bound to cause wholesale transference from wheat growing to the production of commodities which other Canadian farmers were producing and for which there was only a limited market.



From this standpoint it may be said that the attempt to bolster wheat prices was, in very considerable measure, an attempt to bolster farm prices in general.

From the start of the war the prices stipulated in the annual contracts between Canada and the United Kingdom served as guaranteed minimum prices for several major products. Indeed these contract prices, together with various subsidy payments, were primarily intended to encourage production expansion while keeping farm prices from rising significantly. In view of the special war demand they were hardly needed to prevent price declines. Despite the fact that they benefited financially as the war period proceeded and the volume of sales and amount of subsidy payments increased, farmers never became really reconciled to either the subsidy idea or the concept of a ceiling on their selling prices. Realizing that subsidy payments were bound to disappear and believing that the wartime price control policy had prevented them from receiving the returns which they would have received under uncontrolled price conditions, and realizing, also, that farm product prices had fallen drastically after previous wars, farmers began to press for some degree of protection against possible future price declines as early as 1942.

By 1944 it was generally expected that an emergency situation might well occur when the special wartime demand for farm products disappeared and before farmers had managed to adjust production from wartime to peacetime requirements. It was, therefore, felt that the government should take steps to supplement the farmer's efforts to adjust to an abnormal supply and demand situation for which he was in no way responsible. The result was the passage of the Agricultural Prices Support Act of 1944.<sup>3</sup> When the legislation was introduced it was emphasized that it was to apply only during the period of transition from war to peace. At that time the official view was that a price support policy was something that should be applied only in conditions of extreme emergency. In January, 1950, however, it was decided that the legislation should continue to apply beyond the transitional period and it has remained in effect ever since.

The Agricultural Prices Support Act is a general legislative enactment which makes it possible for producers of any farm product, except wheat,<sup>4</sup> to obtain price support if the need for it can be established. When a commodity group desires price assistance its representatives present their case to the three-man board which administers the Act. The board then considers these representations and also investigates such things as the historical price pattern of the commodity concerned and any related

<sup>3</sup> Statutes of Canada 1944-45, Chapter 29; Revised Statutes of Canada, 1952, Chapter 3, "An Act for the Support of the Prices of Agricultural Products during the Transition from War to Peace".

<sup>4</sup> The initial payment under the Wheat Board programme is, in effect, a support price.

commodities, the reasons for the low price of the commodity, the commodity's long-term market prospects, possible storage and disposal problems, number and efficiency of the producers concerned, and any other possible results of providing the support. Following this investigation the board either recommends to the government that price support be given or it rejects the application. If it sees fit to accept the application it will also recommend the degree of price support and the method of giving the support which it considers most suited to the particular case. If the recommendations are approved by the government the board proceeds to implement the support programme. From this it will be seen that the various decisions are based on the special circumstances connected with each individual case at the time the price assistance is requested. The Act makes no attempt to decide in advance that specific products should or should not have their prices supported or that the degree of support should be determined by using a mathematical and historical price formula.

Although it was passed in 1944 it was not until 1946 that the Act became operative. In the ten years that have since intervened price support operations have been carried out for a wide variety of products and for different periods of time. The list of products has included potatoes, apples, dried white beans, honey, dry skimmed milk, butter, cheese, pork and beef. While in most cases the programmes have operated only occasionally and for limited periods, there are one or two instances, notably that of butter, where they have been more or less continuous. In the majority of cases the purchase, storage and resale method of giving the support has been used. In certain instances, however, where marketing boards with experience in handling commodities were established, the support has been given in the form of deficiency payments, that is, payments which represented the difference between the prices actually obtained in the open market and the prices which it was felt that the farmers should receive.

According to the latest annual report of the board the total net cost of the programme from the start of operations in 1946 to March 31, 1956, was \$89,196,061.31. And, of this total, no less than \$70 million was represented by the losses on the large-scale buying and selling operations which were undertaken as an emergency measure on behalf of the hog and cattle producers when the outbreak of foot-and-mouth disease caused an embargo on the shipment of livestock and livestock products to the United States from February, 1952 to March, 1953.

## *V. Trends in Marketing Margins*

Since the start of World War II there have been numerous changes in the size of the marketing margins, that is, the difference between farm

and retail prices or the percentage of the retail prices which is required to cover the costs of marketing. For the most part these changes have reflected changes in the selling prices of the commodities rather than changes in the number of marketing functions and services or the degree of efficiency with which these functions were performed. The reason for this is that the charges made for performing the marketing functions are usually far more inflexible or unvarying than the prices of the commodities. Marketing cost items such as transportation rates, wage rates, insurance rates and general overhead expenses tend to remain unchanged for considerable periods. Since the marketing costs tend to remain unchanged when changes in the prices of the products occur, it follows that marketing margins form a smaller part of the retail price when selling prices rise and a larger part of that price when selling prices fall. Thus higher food prices have usually meant narrower margins and lower food prices wider margins.

In addition to these changes in margins which accompany changes in the prices of the products, however, there are others which result from changes in the number of marketing functions or services and the degree of efficiency with which these are performed. In recent years the number of activities undertaken by middleman agencies has tended to increase. Tasks formerly performed by farmers and consumers have been added to the content of marketing. To a considerable extent this shift has merely represented a further application of the specialization principle. It has been found that many things can be done better and cheaper if done by specialized intermediaries. This explains, for example, why more and more of the poultry is being killed and plucked in plants operated by specialized labour and equipped with special machinery rather than on the farms and why the canning of fruit and vegetables is being transferred from consumers' homes to large-scale specialized processing plants. In certain cases, however, middlemen have undertaken activities because consumers were no longer able to undertake them. Modern housing developments, for example, have made it less possible to store food products in large quantities for long periods in private homes. One result of this is that an increasing number of consumers are renting space in cold storage locker plants. Another result is that products have to be purchased more often and in smaller quantities. For example, lack of storage space in houses has been causing consumers to buy potatoes in 10-pound packages instead of in 75-pound bags as formerly. This, of course, has meant extra packaging and merchandizing. In still other cases tasks previously performed in the home have been transferred to middlemen because increased consumer income has made this possible or because developments in marketing technology, employment of housewives outside the home and changes in the size of the family have combined to justify such a shift. Such factors explain, for



example, why bread is being sliced and wrapped, why poultry is being dressed and carved and why certain commodities are being cooked before being sold to consumers.

While this trend toward an increase in the number of middleman activities naturally adds to the number of marketing cost items, this is not to say that it must always lead to a widening of the total marketing margin. It is always possible that the costs of undertaking additional marketing activities will be offset by reductions in the costs of performing all those already undertaken. This appears to have happened in connection with the marketing of poultry meat in recent years. In the case of some other products, however, such as cheese and potatoes, the cost of undertaking additional marketing activities has been accompanied by fairly distinct increases in the total margin.

Examination of recent trends in Canadian food margins<sup>5</sup> shows considerable variation from product to product. The bread marketing margin fell significantly from the start of the war until 1949 since when it has been gradually rising. Beef and pork margins have risen quite pronouncedly since 1951 as prices for these products declined. Canned fruit and vegetable margins have shown only slight variations during the past seven or eight years. The margin for fluid milk fell from almost 67% of the retail price in 1935 to 44% in 1949 owing largely to an increase in milk prices. Since 1949 the margin has risen to 47% mainly because of higher wage rates paid by milk distributors. From the mid-thirties the butter margin fell as butter prices rose. However, it has remained remarkably constant since 1949 inasmuch as the price support programme has kept butter prices relatively stable.

Regarding the relations between marketing margins and the farmer's economic well-being, the first thing to note is that the very existence of a margin will cause a given percentage change in the retail price to be accompanied by a much larger percentage change in the farm price. This being so it follows that the wider the margin, the greater the difference between the retail and farm price percentage rates will be. In the second place it may be said that any narrowing of a margin which results from increased efficiency in the performance of marketing functions is likely to expand farm income. The increased efficiency, by making it possible to offer goods to consumers at lower prices, will enable farmers to sell more units of product without suffering any reduction in their unit selling price. In the third place it is important to note that under certain circumstances farmers stand to gain from a widening as well as from a

<sup>5</sup> See *Agricultural Institute Review*, March, 1950, pp. 55-57; "Marketing Margins for Selected Canadian Agricultural Products 1935-49" by F. W. Hillhouse and F. M. Schrader, Economics Division, Department of Agriculture, Ottawa, Sept., 1950; and *Economic Annalist*, June, 1956, pp. 70 and 71.



narrowing of a margin. A transference of activities from farmers to specialized marketing agencies which reduces the cost of undertaking the activities will benefit farmers even though it results in some widening of the margin. In the same way the position of farmers will be improved whenever a relatively small amount spent on rendering additional marketing services can bring about a significant expansion in sales.

## FARM INCOMES

### *I. Introduction*

In more recent years, farm income has been a subject of much interest and debate. The recognition of a farm income problem is the result of a logical pattern in the emergence of problems in the historical development of Canadian agriculture. In the early period, problems of production were of paramount concern. These were superseded in time by marketing and product distribution problems. The depression of the '30's focused attention on problems arising out of the collapse in farm product prices. While all of these problems bear upon farm income, it is only in recent years that development and improvement of farm income statistics has made possible a more precise determination of their relationship to, and relative impact upon, income.

Public concern over the farm income situation breaks conveniently into two main groups of problems. In the first group are those problems arising from the relatively high instability of farm income over a period of time. This instability is manifested in the long-run changes, or technically, in the secular trends of farm income, and in the short-run and often sharp changes, referred to as short-term and cyclical variations in farm income.

The second group of problems comprises those related to the income situation at a given point of time. Essentially, these are the problems which pertain to the variation of farm incomes within a given region and the variation of general levels of farm income between areas or regions. This second group or category of problems also includes questions about the comparative income levels in agriculture and in other occupations or businesses.

The materials, analysis and discussion follow the sequence of the grouping of income problems outlined above. Although, as a result of the increased public interest in these matters in more recent years, there

is a greater awareness of problems and difficulties in income definition and measurement, observations and comments on a number of important aspects of these are deemed appropriate.

## *II. Definitions and Accounting*

### *1. Judgment as Factor*

In the application of accounting principles and practices to any business, judgment is a factor of some importance. Most of the routine day-to-day transactions can be handled by accepted rules and procedures and fit nicely into convenient accounting categories of receipts and expenditures. Judgment is required when a periodic assessment of the financial outcome of the business operations is undertaken. At such times, matters of inventory valuations, depreciation rates, capital investment, distribution of earnings and so forth become subject to application of rules and practices within which there may be considerable leeway for individual decision.

The close integration of the farming occupation with the day-to-day living of the farm operator and the farm labour force is a feature affecting the application of income accounting to agriculture. Nearly all of the 600,000 Canadian farms combine a business venture with the farm home and family living.

### *2. Income in Kind*

This term applies to the use of materials produced on the farm and consumed by the farmer and members of the farm household, either in their original state or after certain amounts of processing. The produce, materials and services included in "income in kind" cover a wide range of items in the farm scale of living. Among these items, the most important categories are food, fuel and shelter. At one time the farm household was almost self-sufficient, producing not only the items mentioned, but also clothing, materials for light, and even for recreation in the much smaller amount of time available for leisure activity in years gone by. In the horse-and-buggy era, the motive power for local transportation to church and social affairs was almost entirely farm supplied.

The income in kind component of farm income is still important and significant in total farm income. This means that for a wide range of goods and services, both purchased and produced, each item must be apportioned among the quantities required for farm operation, for sale off the farm and for use in farm family living, and an assignment of price tags and values must be made for these farm-produced items. The imputations of prices and values require a great many judgments on such questions as prices to be charged for farm-produced food used in the farm home, farm-produced fuel used, the proportion of annual pro-

perty taxes representing services contributing to family living, the proportion of automobile operating and capital costs to be charged for family use as against farm business use, and so forth. The imputation of a rental value for the farm dwelling is a complex calculation in which cognizance must be taken of the extent of comfort and services involved. Further, the farm home not only provides shelter for the farm family, but it also shelters the hired help and functions as a business office as well as a dwelling.

In Table 75, income in kind is shown as a percentage of gross income from all sources for the period 1935 to 1955.

Table 75

**INCOME IN KIND AS A PERCENTAGE OF GROSS FARM RECEIPTS<sup>a</sup>**  
**CANADA, 1935 TO 1955, AND AVERAGES,**  
**1935-39 AND 1951-55**

Income in kind as a percentage of gross farm receipts		Income in kind as a percentage of gross farm receipts	
Year		Year	
1935.....	23.5	1945.....	14.8
1936.....	22.8	1946.....	15.2
1937.....	21.5	1947.....	15.6
1938.....	21.0	1948.....	14.2
1939.....	19.6	1949.....	13.4
		1950.....	14.6
1935-39 Average.....	21.6	1951.....	12.6
		1952.....	12.7
1940.....	19.6	1953.....	12.6
1941.....	17.4	1954.....	14.1
1942.....	16.7	1955.....	14.5
1943.....	15.8		
1944.....	13.4	1951-55 Average.....	13.3

<sup>a</sup> Cash income from sale of farm products, plus income in kind, plus supplementary payments.

The relative importance of income in kind as a component of farm income has declined over the years from 21.6% in the 1935-39 period to an average of 13.3% over 1951-55. This decline in the relative importance of the income in kind to total gross income is attributable to the greater increase in income from sale of products off the farm and to a declining rate of direct farm home consumption of farm-produced goods and services. The declining rate of consumption of farm-produced articles represents in part, a substitution of off-farm processing for home processing. Some of the substitutes have been: factory-processed fresh, frozen and canned food items for home-grown fresh and home-stored foods; coal and oil for wood fuel; factory-produced clothing for home-spun clothing; and so forth.



The declining importance of the income in kind item is associated with specialization in agricultural production. This means that many enterprises, formerly maintained chiefly to produce income in kind, have been eliminated on many farms and the cash received from one or two major farm enterprises is used to purchase off-farm produced goods and services for home consumption. In a number of provinces, the farm-produced income in kind is of relatively greater importance in total farm income. Table 76 shows that in eastern Canada, especially in the Maritime Provinces and Quebec, a large proportion of the gross farm income is obtained as income in kind.

Table 76

**INCOME IN KIND AS A PERCENTAGE OF GROSS FARM RECEIPTS<sup>a</sup>  
BY PROVINCES, AVERAGES 1951-55**

Province	Income in kind as a percentage of gross farm receipts
Prince Edward Island . . . . .	17.9
Nova Scotia . . . . .	28.1
New Brunswick . . . . .	26.3
Quebec . . . . .	19.1
Ontario . . . . .	14.1
Manitoba . . . . .	11.5
Saskatchewan . . . . .	8.0
Alberta . . . . .	9.6
British Columbia . . . . .	12.0

<sup>a</sup> Cash income from sale of farm products, plus income in kind, plus supplementary payments.

The variations in the proportions of income in kind to gross income are related to the type of farming and the nature of the climate, which governs the production of many home-consumed items. In particular, these points are discussed in a later section on part-time farming.

### 3. *Net Farm Income Defined*

The close association of the farm operator and his family with the business of farming complicates the determination of the distribution of the net farm earnings among returns to capital, labour and management. Describing the nature of the distribution problem is difficult enough; determining a reasonably precise distribution of returns is even more so. The concern of this study, however, is analysis, not theory. The official income statistics are used, with adjustments where necessary, to serve particular analytical purposes.

The end product of the official Canadian farm income accounting series is designated "net farm income". Net farm income is a residual figure representing the net annual returns to farm operators, and other

unpaid farm labour, from agricultural production activities on farms. It takes account of, as receipts or revenue items, cash received from the sale of farm products, cash received as payments under government agricultural assistance legislation, increases in the value of inventory and income in kind (discussed above). From the total of these revenue items are deducted all current expenses incurred in operating the farm (including among many items: wages and value of board for hired labour, interest paid on indebtedness, rents paid for tenant-operated farms, and the farm business share of property taxes on owned land), decreases in the value of inventory and estimated depreciation on buildings and capital equipment.

The sum designated as net farm income may be considered to provide for:

- (a) a return to farm operators for labour on the farm and management of the farm business
- (b) a return for the labour of non-paid farm help
- (c) a return to the farm operators and farm families on their equity in the capital of the farm business.

The foregoing concept of net farm income, to repeat, is that of a net return to the operator and the non-paid family help. Deducted as an expense are the wages and value of board and lodging to members of the farm labour force hired on a contractual wage rate basis. The sum of their earnings represents a return from agricultural production activities and in this sense can be added back into a net income statement to serve certain particular purposes. For purposes of this study, the net income data used exclude the earnings of the paid farm labour force, although their rates of earnings are considered later.

#### *4. Distribution of Net Farm Income*

While returns to farm capital are not separately extracted and assessed in this analysis, they are a part of the earnings from agricultural production. The payment of interest charges on contractual debts represents a fraction of the return to capital. The remainder of the return when realized is buried in the over-all net income from farming operations. It may be derived by use of a hypothetical rate of return applied to farm capital or by deducting from net farm income an allowance for wages for the farm operators, a fee for the operators' management of the farm businesses and wages for unpaid labour. The residual sum from this arithmetic might be said to represent the return to capital.

It is obvious, however, that such a procedure involves arbitrary assumptions as to appropriate interest and wage rates and farm management fees. Because of these complexities, the distribution of earnings is not pursued beyond consideration of net farm income as return to

the farm operators and the unpaid farm workers. The undetermined return on the equity of the farm operators and their unpaid help in the farm capital remains within this return.

### 5. *Claimants of Farm Income*

An indication of the relative importance of the various categories of the farm labour force having a claim to a share in the income from Canadian agriculture is given in Table 77.

Table 77

## ESTIMATED LABOUR CLAIMANTS OF FARM INCOME 1955, CANADA <sup>a</sup>

	Numbers	Percentage of total
<b>Non-paid help</b>		
Farm Operators.....	588,085 <sup>b</sup>	68.0
Non-paid family help and other non-paid help.....	170,000	19.7
Total non-paid help.....	758,085	87.7
<b>Paid help</b>		
Hired farm workers.....	106,000	12.3
Total net farm income claimants.	864,085	100.0

a Excluding, of course, all of those whose claims have been recognized in the deductions for farm expenses. For example, individuals having claims to an investment return, but who do not participate as workers or managers, are not included in the above figures.

b This is somewhat lower than the total number of farms to allow for farms operated by managers who would appear in the "hired farm worker" category.

The farm owners and tenants, designated farm operators, form the largest component of the claimants, 68%. These, together with unpaid help, account for 87.7% of the claimants. Unpaid farm help consists almost entirely of members of the farm operator's immediate family or close relatives. This point is important in relation to distribution of net farm income. Under certain conditions, a considerable portion of net income is returned to the farm business in the form of improvements, including acquisition of new capital equipment, breeding herds and development of the basic resource, land. Under normal conditions, therefore, a considerable part of the wage claims of unpaid labour are directed into an increasing equity in the farm. Generally these claims, if the equity is not disturbed by a depression or a decline in the competitive position of the farm economy, are recognized eventually in the disposition of the farmer's estate.

## 6. *Purpose of Income Statistics*

The development and definition of appropriate concepts of income and the working out of suitable accounting and statistical methods and procedures for income determination are intricate and difficult tasks. A notion of the elements and interests involved is obtained by considering some of the uses of farm income statistics.

In general, these uses fall into two main categories. First, there is an interest in the current economic position of the farming industry — as to its degree of prosperity or depression relative to other sectors of the economy. The business interests and communities servicing agriculture and farm households are interested in the flow of money incomes to the farmers because the level of this flow determines the volume of their sales of goods and services to the agricultural community. Governments have to be informed on the current income status since they are concerned not only with revenue aspects of agricultural activities but also with the economic situation of the industry as a consideration in general economic policy.

The second major category of use pertains to income measurements and comparisons as a reflection of the welfare of the persons dependent upon the industry and the equity of income distribution between agriculture and other elements of the economy. It is in connection with this use of agricultural or farm income statistics that uncertainties and confusion have arisen. The general time series of farm income statistics represents income from agricultural activities and pursuits and does not include the receipt of income from sources outside agriculture by persons within the agricultural labour force classification.

## 7. *Off-Farm Earnings*

The total earnings of farmers from off-farm sources may constitute only a small fraction of their receipts from agricultural pursuits. But, for certain categories of the farm population and for certain areas, non-farm receipts may constitute an appreciable part of total annual incomes. This is important among persons combining seasonal farming occupations with one or more other seasonal occupations such as construction, forestry or fishing. Further, many persons retire on pension and engage in small-scale agriculture to an extent barely bringing them within the census-defined category of farmers. But the farming receipts of these small-scale operators are accounted for in the official net farm income time series and the farms are included in the divisor for calculating average farm incomes.

## 8. *Sources of Statistics*

There are a number of sources of data on farm incomes in Canada. The regularly published official farm income time series is built upon a large number of other statistical series of production, marketings, prices,



costs and so forth. The *Agricultural Censuses* of 1941 and 1951<sup>1</sup> contain information on components of income and expenses and, in addition, some information on income from off-farm sources. Data on farm incomes are available also from economic investigations and studies carried out over the past 30 years. Although there are differences in concepts and definitions, in methods, and in the degree of representativeness of farms included in these survey and sampling operations, the results from some of these special studies throw light on such matters as sources of income of farm families, relative income levels among types of farms, factors affecting income levels, and many other aspects of farm income.

The net farm income statistics already defined are the basic income series used in this study. This series, of course, as officially published, is a calculation of over-all annual returns from agriculture, available for all provinces except Newfoundland.

#### 9. *Adjustment of Incomes for Changes in the Value of Money*

To provide for summarization and comparison, income statistics are reported in money values, usually current dollars. The difficulties of comparison of money values of farm and non-farm incomes lie in the sources of the income themselves: that is to say, a part-cash, part-income-in-kind scale of living as opposed to an entirely cash-purchased scale of living for the non-farm worker and family.

Consumer price index numbers relating to household purchases by farm families, and purchases of similar items by urban families, have been utilized to adjust farm and non-farm incomes to a constant dollar basis. This provides for comparisons made further on in this study of farm and non-farm incomes both in current dollars and in terms of 1949 dollars.

#### 10. *Definition of a Farm*

The determination of average incomes per farm and per farm worker is necessary for meaningful income analysis, especially in times of rapid changes in agricultural organization. What constitutes a farm and what is a correct definition of a farm are questions settled only with reference to particular purposes, and even to a particular period of time.

In appraisals of the farm income situation, measures of various kinds and of different magnitudes have been used to set a lower limit for the scale of farm operations for the purpose of excluding as farms, enterprises falling below the limit. Some of these measures have been: area of farm (total acreages of improved land or cropland), gross value of products raised or of products sold, and the proportion of the operator's time given to the farm business. No one of these criteria, nor all of them together,

<sup>1</sup> The 1946 *Census of Agriculture* for the Prairie Provinces also, but, of course, there are no comparable figures for the remaining provinces for the same year.

has provided a completely satisfactory basis for a general purpose classification.

At the margin of the classification process, the pertinent fact is the intentions of the operator of the farm. Is he seriously undertaking farming as a means of earning all or a substantial part of his livelihood? Is it a stop-gap way of living, with the residential or home aspects being the predominant motive? Answers to these questions vary from area to area and also over time within farming areas.

Thus far, no statistical weeding-out process has been devised which would assure an accurate count of what might be expressively described as "genuine" farms or farmers. However, accepting uncertainties of the process, some useful information is available from the application of certain criteria obtained in the 1951 census of agriculture. Using a number of criteria relating to the nature and scale of the farm operation, special tabulations provided an economic classification for all farms enumerated within the census definition of a farm.<sup>2</sup>

The four main categories available from the 1951 census were: "Commercial farms", "Small-scale farms", "Part-time farms" and "Institutional farms etc."<sup>3</sup> For purposes of analyzing the distribution of income among farms for this study, certain modifications of census classification were adopted. In the tables and discussion to follow, frequent reference is made to full-scale farms. The full-scale farm, as used in this analysis, refers only to those farms, with gross sales of products in excess of \$1,200, which qualified for inclusion in the census classification designated commercial farms. Those farms with gross sales of products valued at from \$250 to \$1,199, which were included in the census classification of commercial farms, have been included here in the group referred to as small-scale farms. There has been no alteration in the classifications of part-time or institutional farms, but because the latter are operated mainly for other than income-earning purposes, they have been omitted from some phases of the income distribution analysis.

The term full-scale has been substituted for the term commercial, as used in the census, for two reasons. The first is to avoid confusion with the census definition and with census statistics; the second reason is the implication within the term itself that the operators of these farms are maintaining and further developing a full-time, or almost full-time, farm.

<sup>2</sup> In the 1951 census, a farm was defined as "...a holding on which agricultural operations are carried out. The holding may consist of a single tract of land, or of a number of separate tracts, held under different tenures. It must be (a) three acres or more in size or (b) from one to three acres in size with agricultural production in 1950 valued at \$250.00 or more. Where the farm was made up of several parts located in different municipalities, the 1951 Census reported the complete farm as one unit in the municipality where the headquarters were located." *Census of Canada, 1951*, Volume VI, Part 1, Introduction, page XI.

<sup>3</sup> *Census of Canada, 1951*, Volume VI, Part I, Introduction, page XV. See Appendix E for definition of the economic classification.

### III. Canadian Farm Income, 1935 to 1955

#### 1. Trends in Farm Income and National Income

Table 78 sets out a comparison of net farm income and net national income, excluding the farm income component, for the period 1935 to 1955.

Table 78

### NET FARM INCOME AND NET NATIONAL INCOME EXCLUDING NET FARM INCOME (Canada—1935-55)

Year	Net farm income		Net national income (excl. net farm income)	
	Million dollars	Index numbers 1935-39 = 100	Million dollars	Index numbers 1935-39 = 100
1935.....	242	74.4	2,966	83.9
1936.....	241	74.0	3,290	93.1
1937.....	317	97.5	3,772	106.7
1938.....	371	114.2	3,659	103.5
1939.....	455	139.9	3,988	112.8
1935-39 average.....	325	100.0	3,535	100.0
1940.....	486	149.3	4,771	135.0
1941.....	517	158.8	6,073	171.8
1942.....	1,088	334.4	7,349	207.9
1943.....	878	270.0	8,238	233.0
1944.....	1,240	381.3	8,641	244.4
1945.....	972	298.7	8,830	249.8
1946.....	1,139	350.1	8,709	246.4
1947.....	1,206	370.8	9,762	276.2
1948.....	1,682	517.0	11,042	312.4
1949.....	1,641	504.4	11,690	330.7
1950.....	1,448	445.5	12,827	362.8
1951.....	2,155	662.4	15,066	426.2
1952.....	1,923	591.4	16,475	466.0
1953.....	1,697	521.7	17,481	494.5
1954.....	1,190	365.8	17,661	499.6
1955.....	1,454	447.1	19,334	546.9
1951-55 average.....	1,684	517.7	17,203	486.6

From the extremely low levels of the depression years, net farm income followed a pronounced upward trend to a new peak of \$2,155 million in 1951. The increase to that point was greater than the rise in national income exclusive of net farm income. In terms of change relative to 1935-39 = 100, net farm income in 1951 reached an index of over 662 compared with an index of just over 426 for national income excluding agri-

culture. The greater gain in agriculture reflects its start from a very low base of depressed prices and two years of drought disaster in the Prairie provinces.

Although the trend in farm income was steeply upward throughout the period, the substantial income step-ups occurred in 1942 and 1948. The step-up in 1942 and the level of income maintained into the early post-war years represented the Canadian farmers' response to wartime demand and needs. Nature shared in this achievement by providing conditions favourable to high rates of crop production by which subsequent high rates of output of livestock and animal products were made possible. In addition, a lag in the rise of farm production costs coupled with moderate increases in prices received for farm products were also important factors leading to net income gains. As adjustments to peacetime conditions took place, and rationing and price controls were lifted, net farm income received a further impetus and a sharp rise of almost 40% was recorded in 1948 over the 1947 income. Cash receipts from sales of products were increased by nearly \$500 million. Of this increase, about three-fifths came from livestock and animal products and two-fifths from crops. In addition to a strong domestic market for livestock products (meat, dairy products and eggs), the export markets for these and for crops and crop products were extremely buoyant.

In noting the trend of net farm income and its association with a rising trend in the national income, attention is directed to the importance of over-all demand as a factor affecting farm income. The increases in demand for food arising from high levels of employment and increased incomes of individuals and families at home and abroad underwrote a highly prosperous period for Canadian agriculture.

The continuation of relatively full employment and high rates of earnings together with an expansion of the labour force absorbed an increasing proportion of Canadian farm output at generally favourable prices. This culminated in a net farm income record in 1951, an outcome of an unusually favourable set of circumstances of above-average crop yields and a rise in farm prices on the tide of Korean War inflation.

In the years since 1951, aggregate net farm income has failed to hold the gains of previous years. Compared with 1951, net farm income was nearly halved to \$1,190 million in 1954. The sharp decline in income from grain sales was a major contributing factor. Meanwhile the total of farm operating and depreciation charges continued upward through 1952. While expenses were reduced in 1953 and 1954, the decreases were smaller than the reductions in gross income. As a result, the net income of 1954 fell to a level little higher than that of 1946. In the intervening period, index numbers of prices of goods and services used by farmers in family living had risen by 55% and, thus, total net farm income in real terms was sharply reduced.



## 2. *Changes in Components of Aggregate Farm Income*

Changes accruing in the major components of aggregate Canadian farm income are summarized in Table 79. Averages of the components for the five years beginning and for the five years ending the period 1935 to 1955, and the percentage changes in these, ascribe the relative importance of the contribution of each to the over-all gain in net farm income.

Table 79

### CANADIAN FARM INCOME AVERAGES, 1935-39 AND 1951-55 AND PERCENTAGE CHANGES IN COMPONENTS

	1935-39 average	1951-55 average	Percentage increase average 1935-39 to 1951-55
	(thousand dollars)	(thousand dollars)	
Cash income from farm products . . . . .	627,572	2,633,351	320
Income in kind . . . . .	172,859	403,869	134
Value of inventory changes . . . . .	3,890	147,357	2,788
Gross income . . . . .	804,320	3,184,577	296
Operation and depreciation charges . . . . .	479,402	1,515,864	216
Net income excl. supplementary payments <sup>a</sup> . . . . .	324,918	1,668,713	414
Supplementary payments . . . . .	337	10,565	2,135
Total net farm income . . . . .	325,255	1,683,816	418

<sup>a</sup> Payments under Prairie Farm Rehabilitation Act and Prairie Farm Assistance Act.

For the years 1951-55 aggregate net farm income averaged more than five times that of the immediate prewar years. Receipts from the sale of farm products (cash income) increased over four times. The major part of the increase was realized from the rise in prices. Prices received by farmers from 1951-55 averaged two and one-half times the prewar level. But the volume of sales also was higher, an increase of 60% which contributed to the income rise. On the other side of the ledger, farm operating expenditures and depreciation charges have increased, but at a slower rate than the rise in receipts. Operating expenses and depreciation charges are now a little over three times prewar farm expenses. Sharp increases have occurred in "supplementary payments" and over the whole period there has been a substantial net increase in inventory. Neither of these items, however, bulk large in the aggregate income figures. The gain in inventory represents a large increase in grain carry-over on farms. The smallest increase in contribution to net farm income has been in income in kind supplied to the operator and his family. Changes in the proportionate contribution were discussed in detail earlier in this chapter.

The usefulness of aggregate net farm income data for the whole of Canadian agriculture is limited to comparisons such as those made in the foregoing paragraphs. As described elsewhere, this has been a period of marked changes in farm organization, with the result that there have been substantial decreases in the number of farms and in the numbers in the farm labour force. But changes in the number of farms and in the size of the farm labour force have not been uniform or in the same direction in each of the provinces. A more meaningful comparison by provinces is obtained by reducing the Canadian and provincial aggregate net income data to an average per farm.

### 3. *Average Net Farm Incomes by Provinces*

In general, the trend in each of the provincial average net farm incomes has been upward through the 21-year period. But, as suggested, the extent of the increase per farm ranges from a low of 122% in British Columbia to a high of nearly 1,700% in Saskatchewan. This latter percentage figure is meaningful only in relation to the circumstances, which are explained later.

Table 80

#### NET FARM INCOME PER FARM, CANADA AND BY PROVINCES, AVERAGES 1935-39 AND 1951-55 AND PERCENTAGE CHANGE

Province	1935-39 average per farm	1951-55 average per farm	Percentage increase
Prince Edward Island.....	\$360	\$1,586	340.6
Nova Scotia.....	398	963	142.0
New Brunswick.....	300	1,217	305.7
Quebec.....	464	2,195	373.1
Ontario.....	651	3,074	372.2
Manitoba.....	576	2,402	317.0
Saskatchewan.....	210	3,758	1,689.5
Alberta.....	556	3,551	538.7
British Columbia.....	712	1,582	122.2
Canada.....	\$481	\$2,772	576.3

With the exceptions of the two provinces mentioned, together with Nova Scotia, the rates of increase over the period in average net income per farm are relatively uniform. The lower rates of increase for British Columbia and Nova Scotia result in part from the impact of small-scale and part-time farming operations in these provinces.

The spectacular gain in the Saskatchewan figure and the above-average increase for Alberta represent recovery from the Prairie drought cycle of the '30's. The effect of a downward trend in numbers of farms from 1935 to 1955 is apparent in a gain of 576% in average net income per farm compared with an increase in the aggregate net farm income of 418%.

#### *IV. Short-Run Variations in Farm Income*

##### *1. Variation — Causes, Impact and Measurement*

The magnitudes of change in the major component groups of net farm income over a long-term period have been examined. During this period, there have been sharp year-to-year changes about a rising secular trend in net farm income. These variations are examined in the following section.

The recent focus of attention on farm incomes is explained, in large part, by the income instability experienced within the past five years. This more recent instability, following upon the favourable experience of generally rising farm prices up to 1951, has revealed that the income of farmers is still highly vulnerable to disturbances such as adverse weather and changes in demand in the economy at large, as well as to the unfavourable effects of the farming industry's own response to price and other production-increasing influences.

Immoderate variations in farm income adversely affect the production and capital expansion and improvement programmes of farmers, but the extent to which they do so is not measurable. Income variability also has adverse effects upon the credit position of the individual farmer and agriculture generally. It increases costs of credit and makes private planning and credit arrangements of individual farmers difficult and hazardous. Income variations have serious social effects upon the farm family's scale of living, affecting such personal matters as plans for education and health, and other items of the family budget.

To simplify the study of income variations, the main components to be considered are reduced to two: output as reflected in sales, and inputs as reflected in farm expenses. In each of these components, interest centres upon the volume or quantity as one element and upon prices as the other. The roles of each of these factors and the extent to which individual farmers can exercise control over them is examined.

The percentage changes from one year to the next are a simple measure of variation for the purposes of this analysis. Since the degree of change rather than its direction is of interest, the positive and negative signs are ignored and arithmetic averages of the percentage changes are computed for five-year periods and for 1936 to 1955.<sup>4</sup> The results of this calculation for selected components of net income are given in Table 81. An additional series, "Volume of Production", is included and the particular interest in this series will be apparent later.

<sup>4</sup> No adjustment has been made in these measures of variability for trend. In most of the items, the trend was upward throughout the period, and to this extent, the percentage variations are relatively comparable. With trend removed, the percentages shown would all be lower, but by varying degrees for each item.

Table 81

PERCENTAGE VARIATION IN PHYSICAL VOLUME OF  
PRODUCTION, PHYSICAL VOLUME OF SALES, FARM PRICES,  
RECEIPTS FROM THE SALE OF FARM PRODUCTS,  
PHYSICAL VOLUME OF INPUTS, PRICES PAID FOR PRODUCTION  
ITEMS, OPERATING EXPENSES AND NET FARM INCOME  
*(five-year averages, 1936 to 1955 and average 1936 to 1955)*

Periods	Volume of pro- duction	Volume of sales	Prices received	Receipts from sales	Volume of inputs	Prices paid	Operat- ing expenses	Net farm income
1936-40	12.2	11.1	10.8	6.6	2.5	4.7	3.6	15.7
1941-45	28.4	9.1	14.0	19.9	4.6	7.5	10.0	39.8
1946-50	8.7	3.4	7.3	10.6	6.7	6.8	10.5	15.0
1951-55	16.4	7.0	8.0	9.3	3.6	3.5	7.1	26.6
1936-55	16.2	7.7	10.5	11.6	4.4	5.6	7.8	23.8

## 2. *Variability of Receipts*

The share of attention and the emphasis given to agricultural price problems are not surprising in view of the variability of the index number of prices received by farmers as exhibited in Table 81. The long-term average variation per year in all prices received has been 10.5%. Although there has been a gain in stability in more recent years, price instability in itself continues to be a major contributor to income instability. Even in recent years, declines in prices received for farm products have caused sharp contractions in income.

An average price variability fails to reveal the extremes of price fluctuations among a large number of farm products. Differences in variability of prices at the farm are attributable to many causes. The inelasticity of demand for most farm commodities is of major consequence. Small increases or decreases in supply bring about proportionately greater changes in price. The severity of the impact of inelasticity in times of oversupply has been moderated by the development and improvement of storage facilities and methods. Against this, the price margin required to meet processing and other costs between the farm and the consumer is increasing steadily. Furthermore, the marketing margin is not only widening, but it is also becoming more rigid. This is particularly so in respect of the labour cost portion. The net effect of this development is to increase the variability in prices received at the farm.

In general, the individual farmer has only a closely circumscribed control over prices realized. By varying the quantity and quality, or kind of output, and the quantity sold within the bounds of his resources and abilities, he may obtain somewhat better prices. But in the longer run,



the total supply situation outweighs the efforts of the individual farmer. Group action by farmers has yielded only limited results in terms of reducing price variability because of the restricted range of their control of price-making factors.

The strengthening and stabilizing influence of a rising demand upon the general level of farm product prices bears emphasis. Setting aside for the moment the problem of variability in supply, it is significant that the magnitude of movement in prices of farm products has been lower when demand has been increasing at a relatively steady and gradual rate. For example, with no major disturbances of supply during the 1946-50 period, the average variation in prices received was 7.3% in contrast to a much greater variability during the two previous five-year periods. The first of these, 1936-40, was characterized by sharp year-to-year supply changes, but the second period, 1941-45, was marked by abrupt wartime increases in demand of both domestic and foreign origin. In Chapter 2, "The Demand for Farm Products", it was shown that the domestic market is now absorbing a very high proportion of Canadian agricultural output (excluding bread grain), and that the importance of this market will increase in the future.

This has important implications with respect to over-all income variability for Canadian farmers. To the extent that population and incomes increase at a gradual and steady rate, the variability in the general level of farm product prices, and hence the variability in farm incomes, will be minimized. The relationship of demand and price variability is indicated in Table 82.

Table 82

### PERCENTAGE VARIATION IN DISPOSABLE INCOME PER PERSON AND PRICES RECEIVED BY FARMERS

*(five-year averages, 1936 to 1955 and average 1936 to 1955)*

Periods	Average Variation	
	Disposable income	Prices received by farmers
1936-40.....	5.7	10.8
1941-45.....	10.8	14.0
1946-50.....	5.8	7.3
1951-55.....	5.8	8.0
1936 to 1955.....	7.0	10.5

In general, farm product prices have been among the most variable prices in the economy. A comparison of variation in wholesale prices of farm products and of non-farm products appears in Table 83. The apparent gain in stability of prices of farm products in the last ten years

has been discussed above and is pertinent to wholesale farm product prices as well as to those at the farm. Farm product prices have exhibited a 70% greater average variability than non-farm product prices from 1936 to 1955.

Table 83

## PERCENTAGE VARIATION IN WHOLESALE PRICES OF FARM AND NON-FARM PRODUCTS

*(five-year averages 1936-55 and average 1936 to 1955)*

Periods	Farm products	Non-farm products
1936-40.....	11.2	4.8
1941-45.....	11.7	3.2
1946-50.....	8.2	10.0
1951-55.....	7.4	4.8
1936 to 1955.....	9.6	5.7

The second element in the receipts component of income is described as volume of sales. Table 81 indicates that, on the average, variations in volume sold have been somewhat less than variations in price. However, volume of sales is related to and linked with the physical volume of farm output. The volume of output exceeds in variability both volume of sales and prices received. In Canadian agriculture, variability in production is a significant factor in income variability. A high proportion of the variability in physical volume of output of Canadian agriculture is caused by weather factors. Variations in output have a direct effect on volume of sales. To the extent that sales of crops are dominant in total farm receipts, income is subject to greater variation than when a major share of receipts is derived from livestock and animal products. The farmer has a more direct and complete control over the production process for livestock and animal products than for crops.

Variability in output ranges widely in degree from province to province. In Table 84, percentage variations in total output are related to variations in net farm income.

The direct relationship of fluctuations in production to variability in net income is clearly apparent in the record of the 1935-55 period. The Prairie Provinces are subject to a high income variability associated mainly with concentration on a single cash crop, grain. In Saskatchewan, yield variability is extremely high, and supplementary or alternative enterprises do not exist to an extent sufficient to cushion the shock on net incomes in periods of crop disaster. In Alberta, and to a greater degree in Manitoba, the lower annual variation in grain yields together with a greater development of livestock enterprises hold farm income variability at perceptibly lower ranges than in Saskatchewan. Variation in annual

Table 84

# AVERAGE PERCENTAGE CHANGES IN PHYSICAL VOLUME OF PRODUCTION AND IN NET INCOME BY PROVINCES

(five-year averages 1936-55 and average 1936 to 1955)

Years	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Physical volume of production									
1936-40....	4.6	4.3	7.4	4.5	6.7	20.9	78.2	21.9	4.8
1941-45....	16.2	10.0	12.1	12.7	16.3	13.5	55.8	40.2	11.4
1946-50....	7.1	11.7	7.6	10.0	7.2	14.3	10.4	13.0	6.9
1951-55....	9.7	8.8	11.8	6.1	3.5	16.8	45.1	19.9	3.6
1936 to 1955	9.4	8.7	9.7	8.3	8.4	16.4	47.4	23.8	6.7
Net income									
1936-40....	19.8	12.2	14.6	11.1	9.4	75.0	113.1 <sup>a</sup>	73.1	7.9
1941-45....	33.2	23.4	21.8	19.5	22.9	33.8	114.3	83.0	21.5
1946-50....	10.3	24.0	6.6	16.0	8.6	26.7	23.0	23.5	11.4
1951-55....	19.0	10.3	14.4	11.7	12.6	29.6	65.1	26.8	16.0
1936 to 1955	20.6	17.5	14.3	14.6	13.4	41.3	75.0	51.6	14.2

<sup>a</sup> For Saskatchewan, a four-year average only was taken because the net income for 1937 (extreme drought) was minus.

production is higher in the Maritime Provinces, Quebec and Ontario than in British Columbia. Net income variability is about the same for New Brunswick, Quebec and British Columbia. On the other hand Prince Edward Island and Nova Scotia exhibit a higher variability of income. These provinces are highly dependent upon income from three or four lines of production having high price and output variability. For example, potatoes and hogs, important sources of income of Prince Edward Island farmers, are subject to sharp price changes from season to season. In Nova Scotia, annual variations in apple prices and production in past years have contributed significantly to income variability.

While it is generally held that a livestock farming system has a greater stability of income than a cash crop system, this belief requires certain qualification. Variability in cash income from a specialized livestock or animal product enterprise may be relatively high under certain circumstances. As the number of farms specializing in a single line of livestock or animal product increases, the incidence of susceptibility to income variation will tend to become greater.

In livestock production as noted, a greater measure of control of output is possessed by the individual farmer. But he does not control total output. As a consequence, supply-induced changes in prices are an important source of instability in the net income of livestock farms specializing in output of a single species or product. The recurrent cycles

of over — and under — production of hogs and beef cattle<sup>5</sup> are illustrative of instability arising out of changes in physical output which exert their main impact on income through price changes. Table 85 presents a comparison of changes in output (volume of sales) and prices received for hogs and beef cattle over the period 1936 to 1955.

Table 85

**HOGS AND BEEF CATTLE, PERCENTAGE CHANGES  
FROM PRECEDING YEAR IN QUANTITIES SOLD BY FARMERS,  
PRICES RECEIVED AND CASH RECEIPTS FROM SALES,  
ALL CANADA**

(1936 to 1955)

Year	Hogs			Beef Cattle		
	Quantity sold	Prices received	Cash receipts	Quantity sold	Prices received	Cash receipts
1936.....	+21.0	+ 0.8	+22.0	+ 6.7	- 4.6	+ 1.8
1937.....	+ 6.3	+ 5.2	+11.8	+12.4	+27.3	+43.1
1938.....	-14.4	+ 8.0	- 7.5	-21.3	- 4.1	-24.5
1939.....	+ 8.0	- 6.0	+ 1.5	+15.0	+12.9	+29.9
1940.....	+18.4	- 3.5	+14.2	+ 0.7	+12.0	+12.7
Average 1936-40	13.6	4.7	11.4	11.2	12.2	22.4
1941.....	+24.8	+14.4	+42.7	+ 6.2	+21.8	+29.4
1942.....	+ 8.2	+18.9	+28.7	- 3.2	+25.1	+21.0
1943.....	+18.5	+ 9.3	+29.5	- 5.4	+15.4	+ 9.2
1944.....	+10.2	+ 7.0	+17.9	+21.2	- 4.9	+15.3
1945.....	-23.7	+ 4.2	-20.4	+33.8	+ 3.8	+39.0
Average 1941-45	17.1	10.8	27.8	14.0	14.2	22.8
1946.....	-21.2	+ 9.9	-13.4	- 5.9	+ 8.9	+ 2.5
1947.....	+ 5.0	+12.1	+17.7	-23.1	+10.5	-15.0
1948.....	- 5.4	+33.0	+25.9	+26.1	+39.1	+75.5
1949.....	+ 4.9	+ 3.3	+ 8.4	- 7.1	+ 7.9	+ 0.3
1950.....	+ 1.2	- 4.3	- 3.2	- 5.9	+23.4	+16.2
Average 1946-50...	7.5	12.5	13.7	13.6	18.0	21.9
1951.....	+ 7.1	+13.4	+21.5	-23.7	+30.7	- 0.2
1952.....	+13.3	-22.7	-12.4	- 5.4	-24.3	-28.4
1953.....	-23.5	+15.6	-11.5	+22.9	-20.8	- 2.6
1954.....	+ 4.7	+ 2.8	+ 7.6	+15.1	- 8.0	+ 5.9
1955.....	+10.4	-18.7	-10.2	+ 7.0	+ 3.7	+10.8
Average 1951-55...	11.8	14.6	12.6	14.8	17.5	9.6
Average 1936-55...	12.5	10.7	16.4	13.4	15.5	19.2

<sup>5</sup> Though difficult to isolate statistically, cyclical tendencies in production are characteristic of a number of farm commodities. The production changes of shorter duration for eggs, broiler chickens and turkeys are other examples of fluctuations in output following more or less regular patterns.



The data in Table 85 are not intended to present an analysis of the effects of the cyclical pattern of hog and beef production. Analysis for this purpose requires a more intricate statistical treatment of basic data, including correction adjustments for trends in both output and prices. Trend as a factor in prices is of particular significance in the period covered.

The salient points are that both of these major livestock enterprises show a relatively high income variability, and that changes in output and changes in prices have had about an equal weight in contributing to yearly changes in income.

The hog and beef cattle enterprises afford an individual producer considerable control of output. However, changes in total output, given a reasonably steady level of demand, are the main cause of price variability.

The degree of control possessed by individual producers over output varies considerably and is perhaps lower for hogs than for most other livestock operations. Many hogs are produced from home-grown feeds in areas with varying crop yields. Hence, hog output is subject to a considerable variation in accordance with the output of feed crops. The marked increases in hog output during the early 1940's took place mainly in the Prairie Provinces when grain supplies were in surplus. Sharp drops in output, not only of hogs, but also of cattle, tend to follow poor crop years, with varying time lags.

The foregoing comments on changes in hog output relative to the supply of home-grown feed should not be misconstrued as either dismissing the level of hog prices or underrating its importance as a factor affecting hog production. Rather, the point is that there are modifying conditions which, on occasion, interfere with the normal response pattern of producers to price changes. This has been the situation for western Canadian farmers. When, in the past, the ratio of hog prices to grain prices has been favourable to hog production, and when there have been ample grain supplies for feeding, statistics of hog marketings attest to a prompt response of producers, leading on occasion to a surfeit in supply of pork products.

Most of the comment in the preceding paragraphs has dealt with species and products exhibiting relatively large variations in output and prices. For purposes of contrast, and by way of defining the lower or minimum end of the range of output and price variability in livestock products, reference to the situation in fluid milk production is illustrative. In this instance, a combination of circumstances, including ease in delineating market areas and in arranging and policing contracts between producers and processors, together with, in many instances, an existing or developed legal basis in health and sanitary regulations, facilitated the organization and administration of product marketing.

In general, fluid milk producers have realized a relatively large measure of stability in both sales volume and prices received, and thus in income. However, even between the various fluid milk producing areas, there are substantial differences in sales volume, price, and income variability, depending upon the capacity to manage both the production and marketing processes. But the developments in this field of product management show, as a result of the combined effort of farmers, distributors and governments, a minimizing of income variability through control of supply and administration of prices. There has been some uncertainty here, of course, as to objectives, with a consequent confusion between that of reducing the instability of farm income and that of increasing the net income per farm.

The reconciliation of these two objectives is not, in practice, easily effected. It was pointed out in the discussion of specialization in production, and will be shown further in a later section on scale of operations, that developments along these lines, in general, point to an increase in the vulnerability of farm incomes to changes in volume of output and prices. The other side of the dilemma is represented by a mixed farming operation in which the risk of both output and price variability is spread over a range of enterprises, but with a consequent significant limitation of possibilities of increasing net farm income.

### 3. *Variability of Expenses (Inputs)*

In contrast to the instability and variability of prices and output, there is much greater stability in both volume and prices of inputs. Table 81 shows that the annual variations in physical volume of inputs from 1936 to 1955 averaged 4.4% and the prices paid by farmers for production requisites 5.6%.

It has frequently been asserted that in periods of economic adversity farmers attempt to expand volume of output to offset price declines instead of contracting their operations. Insofar as this might be expected to show in an increased volume of inputs, the evidence is to the contrary.<sup>6</sup> During the periods of farm depression, from 1921 to 1924 and 1931 to 1934, a series of successive decreases in inputs was recorded for United States agriculture. There is reason to believe that a significant contraction took place in Canadian agricultural inputs from 1931 through 1937-38.

### 4. *Variability of Net Income*

The high degree of stability in both volume and prices of the input component on the one hand, and the high variability in the volume and prices of the output component on the other, combine to exert a whip action to net farm income. It is obvious that when output falls as a

<sup>6</sup> T. W. Schultz, *Economic Organization of Agriculture*, pp. 211 to 213.

result of crop conditions, or a decline in prices of farm products occurs, the relative rigidity of the costs in agriculture perforce leads to sharp and sometimes precipitous drops in net farm incomes. Conversely, when farm product price levels rise and output increases, net farm incomes increase at a much more rapid rate.

From 1936 to 1955, the average annual variation in net farm income was 23.8% (Table 81). The major factor contributing to this variability is receipts from the sales of products with an average variation of 11.6%. This variation is the combined effect of a 10.5% variation in prices received and a 7.7% variation in volume of sales. In contrast, volume of inputs showed a low annual average variation of 4.4%, and prices of these inputs exhibited just a slightly higher average variation of 5.6%. Operating expenses, the combination of volume and price of inputs, has had an annual average variation of 7.8%.

### 5. *Seasonal Distribution of Farm Income*

In many farm enterprises there is a considerable lapse of time between the initiation of the season's production programme and the realization of receipts from it. Only a few farm enterprises, such as milk production, and perhaps to a lesser extent egg production, can be organized to yield a steady and regular day-to-day output. The intermittent, spasmodic or highly concentrated realization of income is the rule rather than the exception in agriculture.

This feature of income realization has certain implications for financial planning for the farmer. With the passage of time, difficulties inherent in a highly seasonal income pattern have been overcome by devices of credit arrangements and in some instances by a system of spreading returns from sales of products over a period through initial advances and a series of interim payments. However, when conditions develop which upset or interfere with the normal seasonal variation, considerable hardship may result.

Table 86 contains a monthly percentage distribution of cash income from the sale of farm products. The receipts of each month are expressed as a percentage of the average monthly receipts for the five-year period 1951 to 1955. Thus, for example, the total Canadian cash farm income in January has been 77.8% of the average monthly income (100.0%) for the year. December has been the peak cash income month, with receipts equalling 131.4% of the annual monthly average.

The seasonal distribution of output of several important agricultural commodities has undergone considerable change in recent years. Technological developments have made it possible to shift breeding and birth dates for livestock, so that output has become more regular and, in turn, receipt of income has been spread more uniformly throughout the year.

Table 86

# SEASONAL DISTRIBUTION OF CASH INCOME FROM THE SALE OF FARM PRODUCTS, TOTAL AND BY SPECIFIED PRODUCTS, 1951-55 AVERAGE

*(each month's receipts expressed as a percentage of the average monthly receipts)*

	Total	Grains seeds and hay	Dairy products	Poultry meat	Eggs	Hogs	Cattle and calves
January.....	77.8	59.3	71.5	53.7	95.3	88.3	93.5
February.....	67.9	39.0	66.7	31.1	96.4	91.2	83.4
March.....	87.6	63.5	81.0	32.3	110.6	114.1	108.0
April.....	93.7	93.6	92.9	48.7	105.5	94.9	98.4
May.....	99.5	106.9	116.2	62.0	98.2	94.8	107.9
June.....	96.5	106.1	135.3	84.1	88.2	117.3	95.6
July.....	114.3	161.5	129.3	85.5	90.6	84.4	79.6
August.....	77.6	43.3	124.0	111.6	89.1	78.9	83.4
September.....	110.7	91.7	114.4	149.7	92.1	106.5	116.9
October.....	127.6	162.0	104.6	139.6	106.8	98.2	110.9
November.....	115.4	133.2	84.4	102.9	114.4	110.9	110.3
December.....	131.4	139.9	79.7	298.8	112.8	120.5	112.1

On the other hand, specialization, particularly in crop production, has tended to intensify the seasonality of income receipts. This, of course, increases the vulnerability of agriculture to downward price changes, especially those occurring between planting time and harvest. Expenditures at seeding or planting time, particularly commitments for new capital items, are predicated on at least normal production conditions and on a satisfactory price return. If either production or prices fails to meet expectations, the adjustments falling upon the farmer may be rigorous indeed. The proposals for forward pricing reflect efforts to minimize or eliminate the uncertainties of within-season price instability. This refers to changes in prices during a season which represent a marked though temporary departure from the normal seasonal fluctuation.

The seasonal pattern of the flow of total money incomes to Canadian farmers has been modified considerably by the grain marketing and payment procedures of the Canadian Wheat Board. The effects of these on the seasonal distribution of Prairie farmers' incomes have been substantial. Although, a new seasonal pattern is not yet clearly established, the interim payments have shifted a portion of total receipts for grain from the autumn months into the late winter and spring months of the following year. Further, the clearance of grain through out-shipments in spring and early summer has resulted in a high proportion of the total crop being delivered in May, June and July. This has had a material effect in altering, temporarily at least, the seasonal pattern of farm receipts for Prairie agriculture.



## *V. Differences in Farm Incomes*

### *1. Types of Income Differences*

The preceding analysis has been directed to a study of changes in farm income as they have occurred over shorter or longer periods of time. Attention now falls upon a cross-section or profile analysis — a study of farm incomes at or around a given point of time.

The static farm income profile reveals two separate types of income differences within agriculture. There is a significant difference in the level of farm incomes for various farming areas or regions of Canada. The boundaries of these areas or regions do not necessarily coincide with provincial boundaries. They result from the interplay of physiographic, economic and other factors. However, in most cases, Canadian political boundaries approximate agricultural or regional boundaries closely enough so that farm income statistics by provinces are meaningful for the purposes at hand.

The second type of income difference occurs among farms within a relatively homogeneous farming area or region. This type of income difference might perhaps be identified as the normal difference or the difference which is characteristic of most income distribution patterns.

The amount and structure of farm capital has an important bearing upon net farm income levels. The relation of capital to net income and the changes in farm capital over time are examined first, followed by a discussion of income differences.

### *2. Farm Capital — Growth and Relation to Farm Income*

Chapter 1, "Recent Changes in the Structure of Canadian Agriculture", referred to the contribution of increases in capital investment, especially in the form of mechanical power and equipment and producing livestock, to the increase in volume of output per worker. The goal pursued through the addition of capital has been, of course, an increase in net income per farm.

Two frequently used categories of farm capital are "operating" and "fixed" capital. The earlier discussion of increases in current operating expenses (see Table 79) indicates the great increase in that form of capital over the past 21 years. The items of capital in the discussion to follow are mainly of the "fixed" category and comprise the current depreciated values of land and buildings (including fences and other types of fixed improvements such as drainage and irrigation works on the farm), farm machinery and equipment, and the current value of all species of livestock on farms at a given point of time. The aggregation of these items for purposes of the discussion to follow is designated as total farm capital, although it is recognized that these aggregates fall short of the total capital employed.

Table 87 presents a comparison of total capital per farm, net income per farm and the ratio of net income per year to capital, that is, the number of years required for net income per farm to equal total capital per farm.

Table 87

TOTAL CAPITAL PER FARM, NET FARM INCOME  
AND RATIO OF NET FARM INCOME TO TOTAL CAPITAL

(1935-39 and 1951-55)

		Average 1935-39			Average 1951-55	
	Total capital per farm	Net farm income per farm	Ratio: capital income	Total capital per farm	Net farm income per farm	Ratio: capital income
P.E.I.....	\$4,428	\$360	12.3	\$ 9,211	\$1,586	5.8
N.S.....	3,339	398	8.4	7,558	963	7.8
N.B.....	3,129	300	10.4	6,694	1,217	7.0
Que.....	5,265	464	11.3	9,992	2,195	4.6
Ont.....	7,026	651	10.8	18,837	3,074	6.1
Man.....	6,256	576	10.9	17,896	2,402	7.4
Sask.....	7,825	210	37.3	18,716	3,758	5.0
Alta.....	7,490	556	13.5	22,958	3,551	6.5
B.C.....	5,395	712	7.6	10,688	1,582	6.8
Canada.....	\$6,484	\$481	13.5	\$15,920	\$2,772	5.7

There has been a significant change in this ratio for all farms in Canada, from 13.5 in the prewar period to 5.7 in the last five years. The prewar ratio of 13.5 is high because of the effect of the low level of net farm incomes in Saskatchewan, but making allowance for this, the ratio has declined sharply. The changes in the ratios by provinces provide an interesting revelation of the differential application of capital in relation to improvement in incomes. Ontario and the Prairie Provinces employ by far the largest dollar amounts of fixed capital, now ranging from averages of \$18,000 to nearly \$23,000 per farm. The range in the other provinces is from nearly \$6,700 in New Brunswick to almost \$11,000 in British Columbia.

The relationships between the absolute rates of capital turnover and the changes in these over the period shown in the above table are explained in part by reference to the percentage changes in the components of capital given in Table 88. The relatively high rate of capital turnover in terms of income shown for Quebec in recent years is due in some measure to a lag in the rise in values of farm lands and buildings. It will be noted that the capital in land and buildings per farm has risen only 67% in that province. This, together with a slower rate of increase in implements and machinery capital, has limited the total capital increase

Table 88

# CAPITAL PER FARM, TOTAL AND BY COMPONENTS, 1935-39 AND 1951-55 AND PERCENTAGE INCREASES

Province	Total farm capital			Land and buildings			Implements and machinery			Livestock		
	1935-39 average	1951-55 average	Percentage increase	1935-39 average	1951-55 average	Percentage increase	1935-39 average	1951-55 average	Percentage increase	1935-39 average	1951-55 average	Percentage increase
P.E.I.....	\$4,428	\$9,211	108.0	\$3,184	\$6,128	92.5	\$ 544	\$1,172	115.4	\$ 699	\$1,911	273.4
N.S.....	3,339	7,558	126.4	2,556	5,171	102.3	334	1,023	206.3	450	1,364	203.1
N.B.....	3,129	6,694	113.9	2,275	4,712	107.1	360	871	141.9	493	1,111	125.4
Que.....	5,265	9,992	89.8	3,839	6,420	67.2	620	1,285	107.2	806	2,299	176.6
Ont.....	7,026	18,837	168.1	5,298	12,371	133.5	812	2,726	235.7	1,147	3,740	226.1
Man.....	6,256	17,896	186.1	4,388	11,717	167.0	937	3,897	315.9	931	2,281	145.0
Sask.....	7,825	18,716	139.2	6,018	12,702	111.1	1,081	3,957	266.0	725	2,057	183.7
Alta.....	7,490	22,958	206.5	5,471	15,102	176.0	1,075	3,849	258.0	943	4,007	324.9
B.C.....	5,395	10,688	98.1	5,244	6,888	31.4	631	1,523	141.4	892	2,276	155.2
Canada.....	\$6,484	\$15,920	145.5	\$4,790	\$10,517	119.6	\$ 816	\$2,665	226.6	\$ 878	\$2,738	211.8

FARM INCOMES

per farm to 90%, the smallest rate of gain of all the provinces. In the Maritime Provinces and British Columbia, average values of land and buildings per acre also have lagged behind the general rate of increase for other provinces<sup>7</sup> and this has held down the apparent rate of growth of capital per farm.

The marked progress in mechanization in the 21-year period is shown in the large percentage increases in value of implements and machinery per farm in Ontario and the Prairie Provinces. In Nova Scotia there was over a threefold increase, the stock of machinery per farm having increased from the very low prewar average of \$334 to just over \$1,000.

In terms of capital in the form of livestock, substantial increases have occurred in Prince Edward Island, Nova Scotia, Ontario and Alberta. Alberta has had the largest amount of capital in livestock over the 1951-55 period, an average of over \$4,000 per farm. This reflects the large-scale ranching operations and the increased importance of the livestock enterprise on farms in the central and northwest parts of the province.

The relative importance of the proportions of the components of capital appear in Table 89.

Table 89

**PERCENTAGE OF TOTAL FARM CAPITAL BY  
COMPONENTS, AVERAGE, 1935-39 AND 1951-55**

	Land and building		Machinery and implements		Livestock	
	1935-39	1951-55	1935-39	1951-55	1935-39	1951-55
P.E.I.....	71.9	66.5	12.3	12.7	15.8	20.7
N.S.....	76.5	68.4	10.0	13.5	13.5	18.0
N.B.....	72.7	70.4	11.5	13.0	15.8	16.6
Que.....	72.9	64.2	11.8	12.9	15.3	23.0
Ont.....	75.4	65.7	11.6	14.5	16.3	19.8
Man.....	70.1	65.5	15.0	21.8	14.9	12.7
Sask.....	76.9	67.9	13.8	21.1	9.3	11.0
Alta.....	73.0	65.8	14.4	16.8	12.6	17.4
B.C.....	97.2	64.4	11.7	14.2	16.5	21.3
Canada.....	73.9	66.1	12.6	16.7	13.5	17.2

The shift in relative importance of the major components of farm capital emerges clearly. Despite the increase in total acres per farm in the Prairie Provinces, this addition of area and rising land prices has been exceeded by the rate of investment in new implements and machinery. In Alberta, the increase in livestock, cited previously, has made that component the second largest form of capital. In Quebec, Prince Edward

<sup>7</sup> The percentage increases in average values per acre of occupied farm lands 1935-39 to 1951-55 are P.E.I. 82, N.S. 72, N.B. 96, Que. 90, Ont. 118, Man. 165, Sask. 93, Alta. 150 and B.C. 68.



Island, Nova Scotia and British Columbia the capital increases have been proportionately greater in livestock, while in Ontario the trend toward increased scale appears in approximately balanced increases in both machinery and livestock.

The livestock capital includes work horses. Insofar as these have been replaced by mechanical power in the Prairie Provinces, the shift in capital represents a transfer from livestock to implements and machinery. In Quebec and the Maritimes, this transfer has not been large because the mechanization programme in these provinces is just getting under way.

### 3. *Scale of Operations*

There is an increasing awareness of the association of scale of farming operations with level of net farm income. The interpretation placed upon scale of farming operations is a function of the particular type of farming, or system of farm organization, to which the term may be applied. Scale may be achieved by extensification, for example, through increasing the area of the farm, or by intensification, for example, through increasing the capital and the production inputs upon the same area of land.

The pressures and inducements to increase the scale of operation have been strong in the past 15 years. One pressure has been a declining and higher paid farm labour force, which could only be borne on those farms where output per worker could be increased significantly. The inducement to the increase in scale has been the prospect of a substantial rise in net farm returns.

From the 1951 census data, with adjustments as noted, an approximation of the distribution of full-scale and part-time and small-scale farms is presented in Table 90. Table 90 reveals that, based on the criteria adopted, less than two-thirds of the total private farm businesses in Canada qualify as full-scale ("commercial") farming businesses. To the extent that low incomes from agricultural production are associated with part-time and small-scale operations, within each of the Atlantic provinces, Quebec and British Columbia, there is a proportionately large concentration of problem farms. Within these regions or provinces, there are variations in the degree of incidence of small-scale operations. Prince Edward Island agriculture has a smaller proportion of small-scale farms than the other Atlantic provinces.

In Quebec a considerable number of the small-scale farms are concentrated in eastern parts of the province. These areas are extensions of or contiguous with similar physiographic areas of New Brunswick.<sup>8</sup> In British Columbia, the high incidence of small-scale farms is a result

<sup>8</sup> See "Regional Study of Quebec Agriculture", Chapter 8.

Table 90

# NUMBERS OF PRIVATELY OPERATED FULL-SCALE, AND PART-TIME AND SMALL-SCALE FARM BUSINESSES BY PROVINCES — 1951

Province	Total private farm businesses <sup>a</sup>		Full-scale farms <sup>b</sup>		Part-time and small-scale farms <sup>c</sup>		
	Number	Percentage of Canada total	Number	Percentage of Canada total	Percentage of provincial total	Number	Percentage of provincial total
Newfoundland.....	3,620	0.6	401	0.1	11.1	3,219	1.4
Prince Edward Island...	10,132	1.6	5,254	1.4	51.9	4,878	2.1
Nova Scotia.....	23,496	3.8	6,570	1.7	28.0	16,926	7.2
New Brunswick.....	26,417	4.2	7,704	2.0	29.2	18,713	7.9
Quebec.....	134,134	21.6	70,588	18.3	52.6	63,546	26.9
Ontario.....	149,783	24.1	105,819	27.3	70.6	43,964	18.6
Manitoba.....	52,346	8.4	37,326	9.7	71.3	15,020	6.4
Saskatchewan.....	111,872	18.0	82,748	21.4	74.0	29,124	12.3
Alberta.....	84,225	13.5	58,002	15.0	68.9	26,223	11.1
British Columbia.....	26,370	4.2	11,966	3.1	45.4	14,404	6.1
Canada.....	622,395	100.0	386,378	100.0	62.1	236,017	100.0
							37.9

<sup>a</sup> Institutional farms, etc., are omitted.<sup>b</sup> Farms from which products sold value \$1,200 and over.<sup>c</sup> Farms from which products sold value less than \$1,200, omitting institutional farms.

of a very considerable settlement on farms of retired persons who receive investment incomes and pensions, together with an above-average proportion of farm operators engaged in part-time farming.

The commercial development of farming in Ontario and the Prairie Provinces is evident in the proportion of farms falling in the full-scale category. Close to 70% of the farms of Ontario and the Prairie Provinces are full-scale businesses.

The relation of scale of operation to the proportionate contribution to total Canadian farm output is reflected in Table 91. The full-scale farms, amounting to 62% of the total number of farms in Canada, account for over 93% of the total sales of farm products. Part-time and small-scale farms, nearly 38% of all farms, account for less than 7% of the total sales.

Table 91

PERCENTAGE DISTRIBUTION<sup>a</sup> OF NUMBERS OF FULL-SCALE AND PART-TIME AND SMALL-SCALE FARMS AND PERCENTAGE OF TOTAL SALES OF FARM PRODUCTS ORIGINATING FROM EACH, 1950

Province	Full-scale farms		Part-time, small-scale and institutional farms	
	Percentage of all farms	Percentage of total sales	Percentage of all farms	Percentage of total sales
Newfoundland.....	11.2	73.4	88.8	26.6
P.E.I.....	51.8	85.7	48.2	14.3
Nova Scotia.....	27.9	77.9	72.1	22.1
New Brunswick.....	29.1	77.5	70.9	22.5
Quebec.....	52.5	87.8	47.5	12.2
Ontario.....	70.6	96.0	29.4	4.0
Manitoba.....	71.3	94.8	28.7	5.2
Saskatchewan.....	73.8	94.5	26.2	5.5
Alberta.....	68.8	95.1	31.2	4.9
British Columbia.....	45.4	91.9	54.6	8.1
Canada.....	62.1	93.3	37.9	6.7

<sup>a</sup> The percentages differ from those in preceding tables because institutional farms are included here.

Further measures of the significance of full-scale farms in Canadian agriculture appear in Table 92. The full-scale farms of Canada contribute a high proportion of the output of the principal crops and livestock. The value of land and buildings on full-scale farms is nearly 81% of the total value of farm land and buildings. In machinery and equipment, full-scale farms account for 85.4% of the total. In livestock, over 85% of the cattle, hogs, and hens and chickens are found on full-scale farms.

Table 92

PERCENTAGE DISTRIBUTION OF FULL-SCALE AND PART-TIME FARMS AND PERCENTAGE OF THE AREA, ACREAGES IN IMPROVED LAND, ACREAGES IN SPECIFIED CROPS, NUMBERS OF LIVESTOCK ON FARMS, VALUE OF LAND, BUILDINGS, MACHINERY AND EQUIPMENT, 1951

	Full-scale farms	Part-time, small-scale and institutional farms
Number of occupied farms . . . . .	62.1	37.9
Area of occupied farms . . . . .	78.4	21.6
Area of improved land . . . . .	84.5	15.5
Land and building values . . . . .	80.7	19.3
Value of machinery and equipment . . . . .	85.4	14.6
Area in wheat . . . . .	88.5	11.5
Area in potatoes . . . . .	71.3	29.7
Area in tobacco . . . . .	96.2	3.8
Number of cattle . . . . .	86.3	13.7
Number of swine . . . . .	87.8	12.2
Number of hens and chickens . . . . .	85.2	14.8

The importance of scale of operations and its significance as a factor in regional differences in income can bear further emphasis. The desired result of increased scale is higher net income per farm and per worker. An appraisal of the relative impact of scale of operations upon average net farm incomes is afforded by data in Table 93. As would be expected, average net incomes from agricultural operations on full-scale farms are appreciably higher than the average net incomes for all farms. For all Canada, full-scale operations returned an annual net farm income of just under \$4,200 per farm in the period 1951 to 1955.

Table 93

COMPARISON OF AVERAGE ANNUAL NET FARM INCOMES 1951-55, PER FARM FOR ALL FARMS AND PER FARM FOR FULL-SCALE FARMS

Province	Per farm, all farms	Per farm, full-scale farms	All-farm average as a percentage of full-scale average
P.E.I. . . . .	\$1,586	\$2,624	60.4
Nova Scotia . . . . .	963	2,688	35.8
New Brunswick . . . . .	1,217	3,241	37.6
Quebec . . . . .	2,195	3,671	59.8
Ontario . . . . .	3,074	4,180	73.5
Manitoba . . . . .	2,402	3,194	75.2
Saskatchewan . . . . .	3,758	4,813	78.1
Alberta . . . . .	3,551	4,908	72.4
British Columbia . . . . .	1,582	3,204	49.4
Canada . . . . .	\$2,772	\$4,165	66.6



This was about 50% higher than the all-farm average of nearly \$2,800 for the same period. The differences between full-scale and all-farm average net incomes are most pronounced in the relatively low income areas. However, it is significant that, putting aside small-scale farm incomes, there remain significant regional differences in the net incomes of the full-scale farms.

This leads to the question of why relatively low net farm incomes persist in certain regions. While the cause-and-effect relationship is not altogether determinable, over the longer run there is an association of low farm incomes with low regional incomes. This association occurs in some cases despite relatively good agricultural resources. In other instances, the agricultural resources may be poor. In most of the low farm income regions there is lack of urban and industrial development. In long-settled regions, there have been declines in industries and in urban populations. As local markets for farm products dwindled, agricultural production in the area declined because of abandonment of farms and a slow relative, if not absolute, decrease in production activities on the remaining farms. This decline was brought about by the wearing out of capital equipment. The relatively low incomes from farming do not permit accumulation of new capital, and larger scale operations cannot be realized. Thus stagnation and then decline of the farm business is the order. In this situation real incomes become static and then fall. There are no alternatives to farming because of industrial stagnation or decline and the factor of immobility adds to the harshness of the process.

Within generally low income regions, however, there are pockets of prosperous agriculture. This may result from the play of a number of factors. Development of local industry and urban expansion may provide local markets for a range of products for which the area has a comparative advantage. Farmers can organize their production programme within limits so as to obtain the economies of scale. In other cases, an area or part of a low income region may support a relatively high income agriculture because of an endowment of favourable resources of soil and climate. The farms in these high income pockets are usually organized on specialized lines of production permitting economies of scale. The future prosperity of these areas is dependent upon the extent to which technological advances and developments can be incorporated profitably in the farming processes.

The pursuit of increased scale of operations has certain implications for the farm cost structure. In expanding the volume of output, farmers seek to spread a considerable part of their fixed costs over a larger volume. The process of vertical expansion of organization, that is, adding increased inputs and capital to a relatively fixed area, is exhibited in a high ratio of cash operating expenses to cash receipts. The ratio of farm operating charges to cash receipts is shown in Table 94.

Table 94

### CASH OPERATING EXPENSES AS A PERCENTAGE OF CASH INCOME AVERAGE, 1951 TO 1955

Prince Edward Island.....	54.9
Nova Scotia.....	80.0
New Brunswick.....	63.0
Quebec.....	49.8
Ontario.....	50.4
Manitoba.....	45.6
Saskatchewan.....	42.6
Alberta.....	45.9
British Columbia.....	70.0
Canada.....	48.9

In Nova Scotia, larger farms concentrate upon one to three enterprises — chiefly fruit growing, dairying, poultry farming, truck and canning crop production and, to some extent, hog production. These enterprises require heavy expenditures, especially for fertilizers, spray materials, containers and packing materials, and commercial feeds. The agriculture of British Columbia includes a large number of farm enterprises similar to those of Nova Scotia, and, similarly, there is a high ratio of operating charges to cash receipts. The ratio in New Brunswick is high mainly because of the specialized potato enterprise. It will be noted that the ratio drops to about 50% for Quebec and Ontario and then falls off in Prairie agriculture to a low of 42.6% in Saskatchewan, where scale is represented by farming in the hundreds or even thousands of acres.

#### *4. Differences in Income between Farms within an Area or Region*

Within almost any farming area, there is a degree of homogeneity in factors such as soil resources and market conditions. At the same time, there are substantial differences in net income between farms. These reflect differences in the human element, the entrepreneurial talents of the farm operator. Whatever the particular qualifications may be, the inherent differences in ability give rise to a frequency distribution of individual net farm incomes of a more or less general pattern. A few operators enjoy high incomes, a considerable number of operators have incomes about average or slightly below average, and another considerable number usually have incomes so much below average as to be of public concern.

The provision of agricultural extension and educational services is, in part, a recognition of the existence of this problem. These services seek to improve techniques and practices, thus enabling the individual farmer to increase his earnings. In this connection, a positive association

of levels of education with levels of income in farming has been established in a number of special studies. Despite the evidence, the belief is still held in some quarters that, on the whole, the educational standards needed for farming are not very high. The educational factor in farm income will become increasingly important in the future. The increasing scale of operations will demand managerial skills and a fund of knowledge in science, economics and accounting.

Differences in farm incomes at a given point of time develop from a number of causes other than the differences in the human element. The various farm businesses of an area are in varying stages of organization and development. In newly opened farming areas, incomes are low at the early stage of settlement. This is due in part to the partial scale of farming operations. Time is spent in developing the farm by clearing and breaking land and erecting buildings. Productivity remains low until the scale of farming is expanded. In older and more developed areas, low levels of income may obtain during a farm reorganization process. Shifts in demand or loss of comparative advantage may make it necessary to change a type of farming over a wide area. During this period of change, incomes are apt to fall or remain low while the new enterprises are being developed. In some types of farming, such as cattle raising and tree fruit growing, the income-waiting period may be relatively long. Or again, average farm incomes in an area may be low during a period of farm abandonment. The immobility factor may retard retirement of sub-marginal farms and incompetent farmers, thus holding down income levels in an area.

Underemployment of the farm operator and unpaid family labour is not an uncommon characteristic of small-scale and low-income farms. The existence and degree of this underemployment is revealed by reference to the data given in Table 92.

The small-scale farms fall much below average in terms of crop acreages and livestock numbers. Each of these farms has a labour force of at least one, the operator, and many have some additional unpaid family help. The inference is fairly obvious that the labour force is disproportionately large compared with the labour force on full-scale farms. There would be reluctance on the part of these farmers to admit idleness or underemployment and indeed this would be difficult to prove since standards of work effort are relative. The axiom that the time required to do a job is about proportional to the amount of time at the disposal of the person doing it applies to farming as well as to other activities.

## ***VI. Part-Time Farming***

### ***1. Incidence of Part-Time Farms***

For the purpose of an earlier analysis relating to scale of operations, there was a general division of farms into two groups, namely, full-scale

farms and small-scale farms. Within the small-scale group, again, there are two categories, small-scale full-time or near full-time farms, and part-time farms. The time qualifying adjective refers to the approximate amount of time spent on farm production activities by the farm operator.

The part-time farm has been referred to several times in preceding sections. It is singled out here for particular attention because the overall position of part-time farm operators and their unpaid family help gives rise to a very different problem from that presented by the situation of the small-scale full-time operators.

The term part-time farming, even when narrowed closely by definition, is subject to a variety of interpretations. This reflects the range of interests, purposes and intentions of the persons engaging in the activity. They are drawn from all adult age groups and most of the full-time and seasonal occupations other than agriculture.

Useful measures disclosing the success, economic out-come or satisfactions derived from part-time farming have yet to be developed. Some indication of the popularity, if not the success, of the economic outcome and of the satisfaction of part-time farming is given by the incidence of its occurrence. The number of part-time farms in relation to total numbers of farms by provinces as obtained in the 1951 census is indicated in Table 95.

Table 95

### TOTAL NUMBERS OF FARMS AND PART-TIME FARMS, CANADA AND BY PROVINCES, 1951

	Total number of occupied farms	Part-time farms	Part-time farms as a percentage of all occupied farms
Newfoundland.....	3,626	576	15.9
P.E.I.....	10,137	1,321	13.0
Nova Scotia.....	23,515	5,362	22.8
New Brunswick.....	26,431	6,032	22.8
Quebec.....	134,336	21,189	15.8
Ontario.....	149,920	13,364	8.9
Manitoba.....	52,383	3,271	6.2
Saskatchewan.....	112,018	4,376	3.9
Alberta.....	84,315	5,118	6.1
British Columbia.....	26,406	4,526	17.1
Canada.....	623,091	65,135	10.4

The Atlantic Provinces, Quebec, Ontario and British Columbia are the regions in which the part-time farm ranks high in importance. In these areas, there are a number of other occupations which may be com-



bined with farming. In the Atlantic Provinces and Quebec, farming is often combined with two other primary industries, fishing and forestry. Moreover, when it is carried on close to industrial and mining areas, employment is available in factories and at the mines.

In Ontario and British Columbia industrial employment is facilitated by the availability of fast and reasonably priced public transportation services. The transportation factor was an important element in limiting part-time farming development in the past, but it is not of the same importance today because of the widespread ownership of automobiles.

In addition to the factor of off-farm employment opportunities in the development of part-time farming, the basic conditions of climate and the kinds of produce that can be grown or raised are also important. The lack of opportunities for off-farm employment has restricted part-time farming on the Prairies. In addition, the more rigorous climate restricts the range of products, especially fruits and, to a lesser extent, vegetables. This diminishes the economic and psychic returns, and is a factor inhibiting part-time farm development.

It was suggested that the motivations inducing people to take up farming as a part-time occupation varied. Undoubtedly this is the case, but some recent United States studies show that an unexpectedly high proportion of part-time farmers hope to make farming their full-time occupation.

Unfortunately, there is little information available from which trends in the development of part-time farming can be established. The Canadian census of 1951 defined the part-time farm so differently from the 1941 census that comparisons are hardly possible. But, after making allowance for the change in definition, there is evidence that the number of part-time farms is increasing. Part-time farming has been increasing rapidly in the United States. Shorter working hours and fewer working days provide more time for those wishing to carry on a second occupation. Added to this is the increasing population density in urban and immediate suburban areas which is driving families into the countryside. Unless these conditions alter radically, no sharp reversal of this part-time farm movement appears likely in the near future.

## 2. *Off-Farm Employment and Part-Time Farming*

Availability of off-farm income is a requisite for part-time farming. The relationship of the two is established reasonably satisfactorily by relating two sets of data, which, although separated by a ten-year interval, correspond remarkably well. Data from the 1941 census on off-farm earnings were combined with cash farm income data to establish the proportions of off-farm earnings to gross cash receipts by provinces for the year 1940. The results are compiled in Table 96.

Table 96

PERCENTAGE OF GROSS CASH FARM RECEIPTS FROM  
SPECIFIED SOURCES, 1940 <sup>a</sup>

Province	Cash sales of farm products and supplementary payments <sup>b</sup>	Earnings off-farm <sup>c</sup>
P.E.I.....	85.2	14.8
Nova Scotia.....	67.3	32.7
New Brunswick.....	69.7	30.3
Quebec.....	83.8	16.2
Ontario.....	90.0	10.0
Manitoba.....	93.3	6.7
Saskatchewan.....	94.2	5.8
Alberta.....	92.9	7.1
British Columbia.....	82.6	17.4
Canada.....	89.2	10.8

<sup>a</sup> Computed from 1941 census data and annual estimates of cash farm income.

<sup>b</sup> Supplementary payments under provisions of Prairie Farm Assistance Act.

<sup>c</sup> Includes labour earnings of operator, hired labour and family, money received from boarders, campers and so forth, and receipts from insurance claims for hail, fire damage, etc. Does not include government transfer payments and pensions.

Table 95 indicates that part-time farms are proportionately numerous in relation to all farms in the Atlantic Provinces, Quebec and British Columbia. So, too, Table 96 shows that off-farm earnings as a proportion of gross cash receipts were highest in the Maritimes, Quebec and British Columbia. In addition to the relative positions being the same in each instance, the numerical relationships are almost parallel. This adds further statistical evidence to support the claim that part-time farming is associated with off-farm employment opportunities.

Data on off-farm earnings were not collected in the 1951 census. Information was obtained on the amount of time spent by farm operators at off-farm work and this, after adjustments for comparability with similar data from the 1941 census and allowance for off-farm work wage rate increases, suggests a substantial rise in off-farm earnings over the decade. From this it may be concluded that the general relationships shown in the 1940 data still hold, although marked changes in degree have probably occurred.

## VII. *A Comparison of Incomes of Agricultural and Non-Agricultural Workers*

### 1. *Income of Non-Paid Farm Workers and Labour Income of Non-Farm Workers.*

Comparisons of money incomes between agricultural and non-agricultural occupations have been made in a variety of ways. Accounting and statistical studies on this subject have been carried out in a number

of countries as well as in Canada. As would be expected in dealing with a matter in which both the determination and application of concepts and definitions is so important, and in which so many intangibles and non-monetary factors are involved, there has been a range of results and a variety of conclusions. But, in general, the comparisons have shown a significant money income difference in favour of non-farm workers, or groups of workers, as against farmers and agricultural workers.

The comparison to be developed in this section is that of the average net income of the non-paid farm labour force obtained from farming operations and off-farm work compared with the average labour income of the non-farm labour force. The income situation of the paid farm labour force is set aside for later consideration.

Readers interested in details of construction of the income data and the deflation procedures are referred to Appendix E. The income comparisons in current and constant dollars are set out in Table 97.

Incomes of non-paid farm workers have improved substantially relative to incomes of non-farm workers. In the latter part of the 1930's, incomes of non-paid farm workers ranged around one-third of the incomes of industrial workers. In terms of dollars adjusted by farm and non-farm consumer price indexes, the disparity during the prewar period was not quite as large, the average income of the farm workers being about 40% of that of the non-farm worker.

During the war and postwar years, the rise in net farm incomes and the decline in the farm labour force (by far the greater part of which has been in the non-paid category of agricultural workers) combined to effect a very rapid rate of increase in the average net incomes of non-paid farm workers. In fact, on occasion in recent years, the real (1949 dollar) average net income of the farm worker has overtaken and even surpassed the real (1949 dollar) average labour income of the non-farm worker.

Despite the occasional attainment of apparent equality, or near equality of farm workers' incomes with non-farm incomes, the movement out of the farm labour force has continued at a rapid rate in the very recent period. Among other things, this may reflect the continuation of another type of inequality: that is, the relative instability of farm incomes. This, together with the history of a long, even though diminishing disparity, are motivating forces behind the continuing movement of labour out of agriculture. And of not little attraction are the present opportunities to obtain off-farm employment without a period of waiting or uncertainty.

The contrast in stability is exhibited in Table 98. Average (constant dollar) incomes of the non-paid farm workers have exhibited an average annual variation of 18.3% as against an almost negligible annual average variation of 2.7% for non-farm workers' (constant dollar) incomes.

Table 97

NET FARM INCOME AND OFF-FARM LABOUR INCOME PER  
NON-PAID FARM WORKER AND PER FARM  
AND LABOUR INCOME PER NON-FARM WORKER<sup>d</sup>

(income—dollars per year)

Year	Per farm <sup>b</sup>		Per non-paid farm worker <sup>b</sup>		Per non-farm worker <sup>c</sup>	
	Current dollars	1949 dollars	Current dollars	1949 dollars	Current dollars	1949 dollars
1935.....	447	961	282	606	1,009	1,685
1936.....	451	904	283	567	1,057	1,730
1937.....	577	1,046	361	654	1,137	1,805
1938.....	656	1,237	408	770	1,143	1,795
1939.....	782	1,538	495	954	1,181	1,868
1935-39 Average.	583	1,138	364	711	1,107	1,779
1940.....	849	1,520	537	978	1,270	1,933
1941.....	890	1,511	636	1,080	1,337	2,032
1942.....	1,761	2,678	1,352	2,056	1,458	2,000
1943.....	1,476	2,161	1,150	1,683	1,574	2,121
1944.....	2,047	2,910	1,562	2,220	1,600	2,144
1945.....	1,659	2,324	1,252	1,753	1,622	2,162
1946.....	1,938	2,601	1,328	1,782	1,689	2,179
1947.....	2,086	2,584	1,506	1,866	1,876	2,212
1948.....	2,879	3,031	2,120	2,231	2,116	2,182
1949.....	2,864	2,864	2,138	2,138	2,243	2,243
1950.....	2,606	2,544	2,062	2,013	2,325	2,260
1951.....	3,802	3,309	3,252	2,831	2,571	2,261
1952.....	3,498	2,936	3,128	2,625	2,772	2,380
1953.....	3,188	2,787	2,934	2,565	2,931	2,538
1954.....	2,396	2,132	2,144	1,908	3,047	2,622
1955.....	2,886	2,575	2,724	2,430	3,100	2,664
1951-55 Average.	3,160	2,752	2,830	2,477	2,890	2,498
1935-55 Average.	1,852	2,176	1,358	1,595	2,010	2,194

a Newfoundland not included.

b This income figure was obtained by adding net farm income (as defined in Section II, 3) to the estimated off-farm earnings of farm operators and their paid and unpaid help. The average incomes per farm and per non-paid farm worker therefore include elements of return as follows:

- (i) For non-contractual labour (non-paid labour of the operator and other workers).
- (ii) For management (a return to the operator).
- (iii) For use of capital represented by the equity of the operator, and in some instances, equity of the non-paid labour in the farm business.
- (iv) For off or non-farm labour of the farm operator and his labour force.

c This is the average labour income only of all workers other than those contractually hired on farms (paid farm workers) and those working on farms without a wage contract (non-paid farm workers). It does not include investment income, government transfer payments and so forth.



Table 98

# VARIABILITY OF INCOMES — AVERAGES OF PERCENTAGE CHANGES FROM PRECEDING YEAR

(1949 constant dollar incomes)

Periods	Non-paid farm worker	Non-farm worker
1936-39.....	13.2	3.0
1941-45.....	32.4	2.9
1946-50.....	7.2	1.5
1951-55.....	20.6	3.4
1935-55 Average.....	18.3	2.7

This comparison of incomes of non-paid farm workers and workers in industries other than agriculture makes no allowance or adjustment for unemployment either in agriculture or in non-agricultural industries. The incomes compared are those of working members of both the farm and non-farm labour force. To the extent that unemployment and hence sharp losses in income are a sporadic experience of non-farm workers, the comments on income variability must thus be qualified.

The average net incomes of unpaid farm workers should include, in addition to recompense for labour and management, a return upon the operator's equity in the capital stock of the farm. It was shown previously that the 1951-55 average value per farm of the major items of farm capital amounted to nearly \$16,000 as against an average of \$6,500 for 1935-39. For purposes of illustration, let us assume that the average net equity of the farmer for 1951-55 was represented by the increase in capital only. This would be a sum of (\$16,000 minus \$6,500) \$9,500. A return on this at a modest interest rate of 3% (although most farmers pay 5% or 6% or even higher rates for loan funds) would be \$285. Under this assumption, the figure of \$285 would form a part of the 1951-55 non-paid farm workers' average net income of \$2,830.

This illustration should be borne in mind in drawing income comparisons from Table 97. Further, the return on the operator's equity capital, whenever and to the extent that it may have been an item in the total net farm income over time, has been an increasing total dollar component. The next section includes discussion bearing on this point.

## 2. Changes in Farmers' Net Worth

Aside from income variability and comparisons of income levels, the change in net worth is the usual long-run gauge of the financial outcome of an individual's endeavours. Net worth, as a measurement, is most revealing and pertinent in that it not only reflects the degree of achievement in earning income, but also the degree of capacity in managing

the effective disposition of the income earned. It requires an exercise of knowledge and judgment in balancing expenditures on consumption with an accompanying direction of earnings into savings.

The accounting problems and the area of judgment in agricultural accounting referred to in the opening section of this chapter suggest that the year-to-year accounting and statistical farm income determinations may somewhat over — or under — state the real return from the farm business. These possibilities diminish when net worth changes are used for measurement. The longer the time period, the more reliable net worth becomes as an indicator of the absolute and relative financial situation of an individual or an industry. The extent to which net worth may be useful as a measure of individual entrepreneurial ability and income management is conditioned, of course, by the operations of chance in each case.

Lack of adequate information on total assets and the debt position of farmers and other classes of entrepreneurs or workers in the economy preclude inter-group comparisons of net worth. From the capital statement in Table 87, and the preceding discussion, a substantial build-up of farmers' assets is indicated.<sup>9</sup> It would be expected that there have been substantial increases over the 21 years in other off-farm or non-farm assets acquired by farmers out of their returns from farming — bank deposits, stocks and bonds, property and so forth.

As suggested, statistical information about the assets of farmers is incomplete and inadequate, and available information on farmers' liabilities is scattered, fragmentary and, to a considerable extent, inconsistent. This is particularly so with respect to long time series. However, a piecing together of statistics and other information indicates that, from about the outbreak of the war (1939 or 1940) until more recent years (1951), farmers were reducing their total long-term or mortgage obligations. (See Table 51 et seq., Chapter 6, "Farm Credit".) In part this was offset following the end of the war by an increase in short and intermediate term debts for the purchase of new equipment. From evidence available it may be concluded that up until 1951 and 1952, the total liabilities per farm increased only slightly, and certainly far more slowly than the increase in value of farm capital. This then would suggest a considerable gain in net worth with reference to increases in the major components of farm capital.

<sup>9</sup> These average capital data pertain to the total in agriculture and make no distinction as to ownership. A portion of the agricultural capital is owned outside the farming industry (landlords) and, to this extent, the average values of capital stock being used are an exaggeration of the average capital stock per farm operator. This difference would not seriously affect the conclusions being drawn at this point in the study.

Of the gain in value of farm capital of \$9,500, the major portion is represented by a land and building value increase of over \$5,700 and smaller increases of \$1,850 in implements and machinery and \$1,860 in livestock. The land and building value increase is in considerable part a direct result of the increase in the general price level. (Average land values per acre more than doubled from 1935-39 to 1951-55.) But a part of this increased value also represents development of permanent improvements, such as buildings, drainage, fencing and so forth.

In any event, there have been substantial gains in net worth, and despite the drop in income in recent years from the 1951 peak, the indications are that the net worth of Canadian agriculture has continued its upward trend for at least part of this period. From 1951 to 1955, total capital stock of the three main types increased by at least \$750 million. This is appreciably in excess of the increases in the known and estimated debts set out in Chapter 6.

### 3. *Wages of Paid Farm Labour*

Lack of a consistent historical series of farm wage rates for Canadian agriculture restricts an effective comparison of changes in incomes of paid workers with incomes of non-paid farm workers and with the labour incomes of workers in non-agricultural industries. Bringing together available statistical data on wages paid to farm help produces an approximate comparison which appears in Table 99.

The conclusion that past and present levels of average wages received by the paid farm labour force have been low is conservative indeed. Even making allowance for a generous area of statistical aberration, a comparison of the actual or real dollar wages of paid farm help with the two other labour groups shown (Table 97) leaves a wide difference between them.

In terms of their position relative to prewar levels, paid farm workers experienced a distinct improvement in real income up to 1947. Gains in wage rates since then have been insufficient to offset rising costs of living, with the result that real incomes have fallen. This situation has been an impelling force in the diminution of the farm labour supply, driving numbers in the paid farm labour force down from an average of 146,000 in 1946 to an average of 106,000 in 1955.

Income comparison is a difficult and uncertain field of analysis. In the preceding discussions account has not been taken of the less tangible factors contributing to income differences among individuals. In this study there can be little more than acknowledgement of these and a suggestion that quality of labour has probably been of greater significance in determining income differences in more recent years.

Table 99

PAID FARM HELP — ESTIMATED ANNUAL WAGE IN CURRENT  
AND CONSTANT (1949 DOLLARS) AND INDEX NUMBERS, WITH  
INDEX NUMBERS OF CONSTANT (1949) DOLLAR  
INCOMES OF NON-PAID FARM HELP AND NON-FARM  
WORKERS, 1935-39 = 100

*(average of 1935-39 and 1951-55)*

	Annual wages and board paid farm help			Non-paid farm help	Non-farm workers
	Current dollars <sup>a</sup>	Constant dollars	Index 1935-39 = 100	Real income index 1935-39 = 100	Real income index 1935-39 = 100
1935.....	234	414	93	85	95
1936.....	245	431	97	80	97
1937.....	262	441	99	92	102
1938.....	265	450	101	108	101
1939.....	277	483	109	134	105
1940.....	298	477	108	138	109
1941.....	366	556	125	152	114
1942.....	487	709	160	289	112
1943.....	627	894	202	237	119
1944.....	715	1,009	228	312	120
1945.....	777	1,092	246	247	122
1946.....	816	1,111	250	251	122
1947.....	892	1,118	252	262	124
1948.....	960	1,022	230	314	123
1949.....	974	974	220	301	126
1950.....	968	944	213	283	127
1951.....	1,084	945	213	398	127
1952.....	1,168	964	217	369	134
1953.....	1,196	1,017	229	361	143
1954.....	1,184	1,003	226	268	147
1955.....	1,164	989	223	342	150

<sup>a</sup> Average monthly wages and board multiplied by 12.

A thread of evidence lends some support to this thesis. Up to 1941, a statistical series of average annual wages and board for farm help was maintained. The total annual wage of help hired on a 12-month basis was considerably higher than the total annual wage of farm help hired on a monthly wage contract. In 1953, the series on annual wage rates was reinstituted. A comparison of monthly with annual income rates shows that the reverse situation now obtains. The sum of average monthly contract wages is greater than the average annual contract wage.

It may be that the shift over the period represents a marked change in the utilization and quality of paid farm help. During and prior to the prewar era, payment of relatively attractive wages on an annual contract



resulted in the best workers being retained not only on a year-round basis, but also over a period of several years. In more recent years, the number and proportion of farmers retaining year-round help has declined and much of the total hired labour is now taken on for specialized operations such as seeding, haying, and harvesting of grain, vegetable crops and fruit. Paid workers for these operations requiring some skill and experience receive relatively high wage rates for seasonal or summer employment. The paid labour retained on many farms is of a general duty category, and frequently is hired on a seasonal basis, pay for the winter season being at a much lower rate than for the summer season.

### *VIII. Conclusions and Prospects*

The evidence and analysis in this chapter on farm incomes have shown that:

- (a) Farm income in both current dollars and in terms of real income has appreciated substantially over the 21-year period 1935 to 1955.
- (b) Concurrently, the average income disparity between the non-paid farm labour force and the labour force in the rest of the economy has been materially reduced.
- (c) Within the agricultural economy there remain two types of low income situations which give cause for concern. There are:
  - (i) Individual farmers within prosperous farming areas who, because of incompetence, unfortunate circumstances or other reasons, have been unable to marshal and manage good resources to produce a satisfactory level of income.
  - (ii) Whole areas or regions where average incomes are low and where prospects for significant improvement in incomes are poor.
- (d) There is another group which has low agricultural incomes but which is able to enjoy a reasonably satisfactory standard of living because of its ability to obtain additional income from a variety of sources and occupations. Many of the part-time farmers are in this category.
- (e) There is a somewhat reduced but continuing high susceptibility of farming to substantial annual income fluctuations. The causal factors here are primarily yield variability in the Prairie Provinces and price variability in the rest of Canadian agriculture.

The first paragraph of this chapter referred to the shifts in emphasis which have been given to various phases of the farm income problem throughout Canadian agricultural history. The cumulative results of those periodic focuses have been an accumulation of federal and provincial legislation and types of activity designed to meet particular situations.

Step by step, and over time, agriculture has benefited from a series of measures and activities directed to improving and stabilizing farm incomes. Many of these are referred to throughout the various chapters of this study.

It is expected that over the next 25 years incomes of farmers and farm workers will improve at approximately the same or a slightly faster rate than the real income gains in the economy at large. Accompanying this gain in real income will be substantial changes and gains in the scale of farm family living. A much higher proportion of the content of farm family living will be of off-farm origin — the purchase of foods already processed instead of foods produced and processed on the farm, substitution of purchased fuel — oil and coal — for home-produced wood and so forth. The disparity between the content of living of people on farms and that of people in urban centres will be materially reduced.

The family farm will be retained in most types of agriculture but will resemble a business operation to a much greater extent than today. Farm business records will be kept, and knowledge of the non-farm sectors of the economy as well as the internal farm business will be necessary for the making of sound managerial decisions. There will be much greater sums of money to disburse. Mistakes of judgment will be costly indeed, but wise decisions will pay off in higher rewards.

**PART IV**

**PROBLEMS OF CANADIAN AGRICULTURE**





## PROBLEMS OF PRODUCTION AND INCOME

OVER THE period with which this study is concerned, two groups of problems may be expected to confront Canadian agriculture—problems in the production field and problems in the income field. Our study does not, and cannot, lead to clear-cut and incontrovertible conclusions regarding appropriate methods of reducing or eliminating the conditions which give rise to problems. One reason for this is that the solution of these problems is further complicated by questions of policy decisions, interpretation and procedures. For example, there is the question of how far the respective governments in Canada should engage in programmes designed to expand agricultural production. Assuming that there is no predisposition to spend government funds to achieve levels of output which can be obtained without such expenditure, the question is primarily one of interpretation of trends, particularly trends in demand and techniques. As we point out, the growth of demand and of techniques cannot be projected with certainty. In appraising these an element of judgment is unavoidable. This is a difficulty from which we cannot escape — we cannot project the future without expressing a judgment.

The problems relating to farm income are similarly complex. In many cases the procedures which might be adopted, although contributing to the solution of a particular income problem, generate new problems. It cannot therefore be clear whether, on balance, the procedures are desirable. Further, in most, perhaps in all, cases, there are several procedures which might be adopted. The relative merits of these procedures must again be a matter of judgment. In this study we have attempted to describe some income problems. In some cases we have outlined alternative measures which have been, or might be, undertaken to deal with them. And, at some points we have suggested an approach which might have merit. We have, however, sought to avoid presenting our thinking on these matters in the form of conclusions.

The production problems are those involved in securing a substantial increase in total output, with more significant increases in the production of certain products than of others. There can be general agreement that, as domestic demand develops, Canadian agriculture should be expected to meet the increased requirements, provided this can be accomplished efficiently and without imposing a burden on Canadian consumers. The nature of the adjustments necessary to meet the anticipated increase in demand have been described in earlier chapters of the study. The analysis has led to the conclusion that, given a reasonable rate of improvement in technology, the available resources will permit Canadian agriculture to meet the requirements without undue difficulty. Some of the particular problems which may be encountered along the way are discussed in this chapter.

Certain features of farm incomes were described in Chapter 13. The analysis disclosed that the real incomes (goods and services procured from production either directly or by exchange) of those engaged in agriculture have, over the long run, tended to be low in comparison with incomes earned in other occupations; that in recent years farm incomes have been falling while other incomes have been rising; that there remains a substantial number of farms providing relatively low real incomes; and that the incomes obtained from commercial farms are highly irregular. Agricultural producers, through their representatives, have been pressing for measures designed to alleviate these conditions. There is as well an increasing general awareness that instability of income militates against efficiency of production and has disturbing effects on the economy as a whole. If people were content to live on small farms and on the meagre incomes provided by them, the continuance of the small low income farm would present no problem. The condition emerges as a problem when, and to the extent that, it becomes the basis of demands for assistance to agriculture from general tax revenues or for unusually heavy expenditures on social services in low income areas. Dissatisfaction with the low standard of living provided by the subsistence or small farms is evident both from the demand for compensation for low incomes and from the continual movement of people out of low income areas. We hope that over the next 25 years there will be some further narrowing of the disparity between farm incomes and those in other occupations, a reduction in the number of low income farms and greater stability of farm incomes.

The achievement of the production objectives should be accomplished in a manner consistent with the income objectives. The anticipated increase in demand, the factor creating the need for increased production, is itself favourable to amelioration of the income conditions. Apart from other influences, growing demand would lead to a strengthening of farm prices, with a relatively sharp increase in the prices of those products for which

the demand is increasing most rapidly. Increasing prices would induce the production responses required and at the same time raise the level of farm incomes. The other influences include technical improvements, with their impact on costs, production and prices, and public measures, which may also affect production and prices. The desirable condition is a flow of products increasing steadily with expanding demand; this will prevent the emergence of shortages and scarcity prices, while permitting prices to distribute higher farm incomes. Too rapid a rate of expansion of production, by whatever influences it may be induced, would render the achievement of the income objectives more difficult.

It should also be said that measures designed to raise and stabilize farm incomes, while consistent with the object of increased production, should not be self-defeating. Rising prices not only distribute higher incomes, they serve also to provide incentives to increased production which, in turn, can have a depressing effect on prices and incomes.

Past experience demonstrates the readiness of Canadian farmers to increase production when adequate incentives are present. Indeed the tendency is for over-expansion to occur. The process works roughly in this way. A particular form of production becomes relatively profitable. Farmers plan to increase output. The production process takes a considerable period of time during which many farmers, acting independently, become involved in programmes of expansion. Eventually increased production comes on the market. Prices begin to fall. Increased supplies continue to be marketed. Prices fall farther, and profitability is reduced. Eventually reduced profitability leads farmers to plan reductions in output, but again this takes time. Thus adjustment of production induced by the price mechanism proceeds fitfully. This is one of the causes of instability in farm prices and incomes. Thus under conditions of steady but unspectacular increases in demand, additional inducements to expansion are likely only to accentuate the tendency to oversupply and hence instability.

Predictions extending over 25 years must necessarily be subject to a wide margin of error in both directions. Our estimates of demand for farm products are based primarily on estimates of domestic population and the disposable incomes of Canadian consumers. Other uncertain elements in the projection of domestic requirements include unforeseeable changes in the food habits and tastes of Canadian consumers and the effect on consumption of changes in the relative prices of particular products. The actual rate of increase in the domestic demand for farm products may diverge significantly from the estimates. With respect to exports we assume that Canada will continue to have an advantage in the production of a number of farm products. How far this condition may enable Canada to expand agricultural exports is highly uncertain. We conclude that Canada will maintain her position in the world markets for wheat; but we can find no basis for predicting the volume of exports

of other products and, for the period as a whole, believe it safest to conclude that total agricultural exports other than wheat will not be significant. The rate of technological advance will be an important factor affecting the future. That advance will occur is certain; but its rate and direction are highly uncertain.

We have little doubt that our broad conclusions will be proven correct during the shorter period of the next 10 to 15 years. Beyond this we cannot be so sure. However, as we approach 1970, the conditions to be expected in the decade 1970-80 will become clearer than they are today. Whatever modifications may need to be made later, we are satisfied that the conclusions reached from our study can provide a sound basis for broad decisions which must be made in the more immediate future.

## ***I. Production Problems***

### *1. Land Settlement*

From our study of the probable growth of demand, the available land resources and the prospective development in technology, we reach the conclusion that it will be possible to meet the increased production requirements and to raise the level of farm incomes without significant extension of agricultural settlement and without creating a problem of higher food costs to the non-agricultural section of the population. The conclusion is largely the result of a conviction, supported by past experience, that, even if the demands upon our land resources should prove greater than can now be expected, advancing technology and skill in the application of technical knowledge to production will enable Canada to meet these demands without serious difficulty. (This does not mean that agricultural prices will not rise moderately, relative to other prices.)

Canadians are conscious of the extent to which the growth of national population and wealth, in an earlier period, resulted from the opening up of the West and the settlement of the Canadian portion of the great plains region. The process was dependent upon a historic conjuncture of circumstances, including technical developments initiated in the 19th century, the existence in Canada of a large area of land which could readily be brought into cultivation, and the emergence of an expanding European demand for cereals. The fact that adjustment to these particular conditions had been largely completed by the 1920's may have been obscured by the depression and drought of the 1930's and the peculiar demands of the period of hostilities in the 1940's. We can see no prospect of a combination of like factors in the future. The technical developments of the second half of the 20th century will have different economic consequences from those which followed the developments of the second half of the 19th century, in an extensive sense the settlement of the plains



region of Canada has been completed. The main element in the future demand for Canadian farm products, it seems reasonably certain, will be the growth of domestic population and incomes.

During the earlier period, agricultural settlement was facilitated by various public measures, including assistance to immigrants desiring to settle on new lands, subsidies to transportation agencies and land settlement companies, and offers of free land. In recognition of the completion of "the purposes of the Dominion", the remaining public lands were transferred to the Prairie Provinces in 1931. Since then, apart from civilian rehabilitation movements during the depression and drought years of the 1930's and veteran settlement projects after World War II, governments have, on the whole, shown little concern to induce further expansion of agricultural settlement. This public attitude reflects a general recognition that the circumstances have not warranted public expenditures to increase agricultural output by opening up new producing areas.

The public attitude has also been affected by the increasing costs of establishing new rural communities. These include the costs of developing the farm unit and the costs of providing community services. In the Prairie Provinces the cost of land improvement in the areas of potential development, which lie in the wooded region, greatly exceeds the cost of improving land in the prairie and parkland region. While marked advances have occurred in mechanical methods of clearing and breaking land, the use of these methods requires substantial initial capital expenditure. This is a deterrent to private expansion of settlement. The social costs of establishing new communities include the provision of roads, schools and health services. In view of the extent of services collectively provided in established communities, new settlement is not likely to occur in any marked degree without large initial public expenditure in community development; and, with the acceptance of the principle of equalization of essential services, governments are already committed to substantial contributions in support of services in fringe areas. In our view, the prospects do not indicate any appreciable need to promote geographical extension of agricultural settlement; and it appears that the cost factor, along with an enlightened public understanding of the consequences, will prove a significant deterrent to elaborate programmes designed to extend agricultural settlement.

It may be expected that, for purposes other than promoting agricultural settlement, transportation facilities will be extended into or through new areas, and that some agricultural development will be induced in this way. However, it does not seem likely that expansion initiated in this manner will have any significant effect on the orderly progress of the agricultural industry.

## 2. *Conservation*

The problem of reconciling the private use of land resources with the public interest is a continuing one, but the nature of the conservation problem changes over time.

In the agricultural development of a new region deterioration of land resources may occur as a result of lack of knowledge of the physical characteristics of the resources and the consequent failure to employ methods of use consistent with their conservation. This difficulty has been amply demonstrated in the history of agriculture in the semi-arid parts of the Prairie Provinces. The experiences of the early 1920's in south-eastern Alberta and southwestern Saskatchewan, and of the 1930's over a much larger area, were apparently necessary to demonstrate the character of the climatic factor and the limits this imposed on the use of land for permanent crop farming. To correct earlier mistakes it was necessary to undertake major measures of rehabilitation involving adjustment of land use, development of appropriate techniques, provision of water supplies and assistance to resettlement. The adjustments have been largely effected, and the experience is a matter of record for future guidance.

The type of farming dictated by economic factors has a bearing on land conservation. The nature of the demand was such that, at the time the Canadian prairies were opened up, settlement could have proceeded only on the basis of a large measure of specialization in wheat production. Monoculture contributed to the deterioration of land from wind and water erosion. Our study leads to the conclusion that, over the next 25 years, the principal change in agriculture in the western provinces will be a substantial increase in livestock production, which will be secured by more intensive use of land now in farms. Livestock production, and the changes in land use required to effect it, is more likely to be consistent with land conservation. To this extent the problem of conservation may be expected to diminish.

Loss of productivity occurs as a result of ignorance and the abuse of land, that is to say, through bad farm management practices. (Low incomes may also be a cause of practices leading to land deterioration.) There is ample evidence to prove that the family farm, that is, a farm operated with little or no hired labour, can be a highly efficient producing unit. The persistence of the family farm means, in the aggregate, a large number of farm managers. Within this large number the range of managerial capacity will be wide and there will be many relatively poor managers. Insofar as abuse of land results from bad management it is likely to remain a problem. However, the problem may be expected to diminish for several reasons. We believe that the number of farm units will continue to decline. The reasons behind the decline suggest that, with smaller numbers of managers, the general level of management skills will be higher. There are other reasons, including an improved level of general

education and more effective information and advisory services, for supposing that our lands will be more effectively managed in the future.

The term conservation has come to be used, perhaps inadvisedly, to refer to procedures having the effect of increasing the gross productivity of land. The productivity of land can be increased by investment in improvements of a more or less permanent character. The construction of irrigation works, drainage and flood water control are illustrations of this form of investment. Insofar as the application of water and the adoption of the practices of irrigation farming replace types of land use which are contributing to the deterioration of land, irrigation investment serves to conserve land resources. However, since a significant consequence of irrigation is that, under conditions of low rainfall, the total output of a given area of land may be substantially increased by the application of water, large-scale irrigation projects are more correctly to be judged as forms of investment designed to expand agricultural output. (They may also have important income effects.)

It has been the experience with large irrigation projects that the investment costs cannot be recovered from charges levied against the land users. Public subsidization of irrigation is frequently defended or supported on the basis of indirect benefits which may accrue both within the immediate locality and more widely. Insofar as these indirect benefits occur, it can be shown that similar benefits might follow from any form of subsidized investment. Indirect benefits from investment are not peculiar to irrigation, and, therefore, they provide no special reason for public expenditures in this form. From the point of view of agriculture the basic questions to be considered in appraising proposals for large-scale public investment in irrigation or other projects are (i) is the increased output required? (ii) is public investment necessary to induce it? and (iii) could the same results be obtained at less cost?

Our study of the prospects in agriculture leads us to the conclusion that a substantial increase in the output of livestock and livestock products will be required in the next 25 years and that the main problem in securing this expansion will lie in the provision of feed for beef production. Extension of irrigation in the Prairie Provinces could contribute to the solution of this problem. However, we conclude that, certainly in the shorter period and probably over the whole 25-year period, farmers across Canada will, in general, be able to effect the necessary increases in production without substantial inducements from the expenditure of public funds. Should circumstances develop which would seem to necessitate special inducements from public expenditures, there are many different ways in which inducements could be offered. We cannot, at this time, say that the precise circumstances may be, and, therefore, it is impossible to compare different methods of accomplishing the particular objectives.



### 3. *Technology*

The ability of Canadian agriculture to meet the increasing demands upon it without recourse to new areas of settlement and without a significant increase in food costs to Canadian consumers depends upon the rate of improvements in farm techniques. It is certain that significant improvements will occur, and that these improvements will combine with growing demand to induce increases in output. The rate of advance cannot be closely regulated or controlled, nor can the direction of important changes be confidently anticipated. Because of the general gains which come from improvements in technology, there would seem to be justification for maintaining the national effort in agricultural research. Moreover, should the need for public stimulation of output appear, increased research into production methods would be one of the most effective ways of bringing this about. Over the period some change in emphasis may prove to be desirable. We have referred to the particular difficulties of securing a sufficient expansion of beef production. With this in view, it would seem reasonable to place particular emphasis on the improvement of beef cattle, feeding for beef production, production of forage crops and the carrying capacity of grasslands.

### 4. *Agricultural Credit*

We anticipate a continuation of the trend toward larger farms, increased total investment in the farm business and a relatively large increase in the investment in machinery and livestock. Easy credit is not suggested as the solution to the problem of increasing capital requirements. Easy credit may only aggravate some farm problems, for example, by inducing expansion of output and lower prices, or by generating competition for land and an increase in land prices.

By and large, the institutional arrangements for the provision of credit to farmers appear to be adequate to meet the future requirements; but three problems will require consideration.

It is evident that there is general support for the family-owned and family-operated farm as a social institution, and this type of farm organization is not inconsistent with the efficient use of resources. As the capital required for efficient operations increases, the problem of the transfer of the farm property from father to son, or of the purchase of a farm property, becomes more difficult. Family arrangements will certainly vary with the particular family circumstances, but it seems likely that an increasing proportion of farmers who come to the age of retirement will wish to withdraw enough capital to enable them to purchase a home off the farm and to live in the village or town. In many cases it will be difficult for the son to find the necessary capital to enable the father to retire or for the purchaser to meet the needs of the previous owner.



The second problem results from the anticipated need, if the growing demand for farm products is to be efficiently met, for building up the investment in equipment and livestock. It is important that the inventory and production adjustments needed should not be impeded because of deficiencies in the arrangements for the provision of credit. The productive life of most farm equipment extends over a number of years, and the requirement of rapid payment of the initial cost price may be a serious deterrent to investment. Similarly, the building up of an inventory of productive livestock takes time, and a substantial period may elapse before returns are realized.

The third problem concerns the farmer who, along with others, is temporarily without working capital as a result of widespread and unforeseen disaster. This problem can be approached in different ways, some of which are discussed in reference to the irregularity of farm income. However, one solution might be found in government-backed disaster loans.

## 5. *Conclusion*

Assuming that the increase in domestic demand occurs in an orderly manner as a result of steadily increasing population and income, there is reason to be confident that Canadian farmers can, and will, make the necessary adjustments. Minor modification in the conditions for securing credit would facilitate the adjustments on individual farms. Continued research effort, with particular emphasis on increased efficiency in livestock production, might be a wise precaution, especially in view of the relatively rapid increase in demand for livestock products which can be expected. It is doubtful that it will be necessary for governments to become involved in substantial settlement programmes, or to induce increased production by large-scale public investment in land improvement. Such programmes could have the effect of upsetting the balance between production and demand, which would be inconsistent with the income objectives.

## II. *Income Problems*

The analysis of farm incomes is complicated by the inclusion, within the definition of agriculture, of land holdings which are not used wholly or primarily for the production and exchange of agricultural commodities. Some holdings are little more than places of residence, providing an agreeable opportunity for sparetime activities, a means to secure part of the consumption requirements of the family, or a modest addition to other earnings. The cash income derived from the sale of produce of these holdings, or the value of produce provided to the family, should not be taken as a measure of the agricultural productive capacity of the holdings; nor should they be appraised in terms of the normal criteria

of efficiency. This is not to say that the conditions of life are always satisfactory; but, so far as there is an income problem on this type of property, the problem cannot be associated with agriculture. Other holdings are more clearly part-time farms. The extent of the farming operations carried on and the production designed for the market reflects, in many cases, a considered attempt to combine commercial agriculture with other income-producing activities. Whether or not these properties should be considered as part of the agricultural industry is perhaps largely a matter of the extent of farm production on them. Any method of differentiation must be arbitrary. While there are apparently a large number of part-time farmers, they tend to be concentrated in certain locations where non-farm earning opportunities are available. Insofar as the produce from part-time farms enters the markets, the activities on them affect the position of full-time commercial producers. It is therefore impossible to exclude them from agriculture or from consideration of the problems of the industry.

### 1. *The Part-Time Farm*

The availability of assistance from the family in the performance of many farm functions and the seasonal incidence of much farm work provide many opportunities for the successful combination of farming, on a limited scale, with *off-farm* activities. Provided that employment is assured, the combination can, for many, offer a satisfying way of living. The demands of the non-farm occupation frequently result in inefficient use of the agricultural resources at the disposal of the farm family. It is probable that the producer who receives a substantial part of his total income from non-farm activities is a weak seller, and that concentrations in particular areas may create disturbances in the markets available to producers who are wholly dependent for their livelihood on the sale of produce. If, as seems certain, the part-time farm is to persist, it would perhaps be wise for research and extension agencies to give more attention to its problems and to the problems it may create for the industry as a whole.

There is another type of part-time farm which cannot be judged on the basis of its capacity to produce income from the sale of farm products alone. Here the source of supplementary revenue is found on the farm itself. In the Maritimes and Quebec the land holdings frequently include a significant acreage of woodland, in addition to the arable and pasture land available for agricultural production. Because of the seasonal differences in the timing of the operations, the woods enterprise and the farm production can be efficiently dovetailed. Given markets for the products of farm and woodlot, and concern for the efficient management of both the timber and the land resources, the combination of farming and silviculture can provide a satisfactory total operation and the participa-

tion of the part-time producer need not present any problem in the markets. In Canada this type of integrated operation should receive more attention than it does.

## 2. *Problems of the Commercial Farm*

Provided production is not expanded too rapidly, the anticipated growth of demand for farm products should, over the long run, raise the levels of farm incomes. Insofar as the incomes of farm producers, including returns to investment, management and labour, have persistently lagged behind earnings in other occupations, the condition can be attributed to a continuous pressure of supply on the markets for farm produce. The reasons for this pressure are complex. Many farmers, in comparing incomes from agriculture and other occupations, find real compensations for lower money earnings from farming. However, the rapid movement off farms when alternative employment opportunities are plentiful and the pressure on government for action to support farm incomes are evidence that continuing disparity in earnings is a matter of concern to those engaged in the industry. Some of the pressure is due to the persistent tendency, where conditions of demand or advancing technology are favourable, to over-shoot the mark in production responses; this is coupled with impediments to withdrawal when production becomes unprofitable. Public policies have generally been directed to stimulating expansion of agricultural production. Cheap food and a large flow of products off farms have been approved by other sections of the community.

In the parts of this study dealing with farm production and production problems we have brought out the evidence of a marked capacity on the part of Canadian farmers to expand production where incentives exist; we have concluded that, under the incentives afforded by increasing demand and with the help of improved technology, Canadian farmers will be able to meet production requirements without much difficulty.

Historically, farm incomes have been comparatively favourable during periods of rising and high demand. As an increasing proportion of production is directed toward the domestic market, the maintenance of consumers' demand at a high and steadily expanding level would make a major contribution to an orderly advance in farm incomes. Sharp declines in consumer purchasing power are quickly reflected in farm prices and incomes. Extended periods of unemployment and low incomes create acute problems. The usual rural-urban flow of population is stopped, and unemployed persons move back to farms. Total employment in agriculture increases, and output may be expanded. The process is socially preferable to reduction of output; but a substantial part of the burden of industrial depression is, in this way, borne by farm families. Insofar as it would be possible to reduce industrial fluctuations and to maintain the economy at a high level of employment and incomes, the interests of the agricultural

industry would be well served. However, even the most favourable conditions of demand, operating over a period of time, would not entirely eliminate income problems which result from circumstances internal to agriculture; and declines in particular demands may cause pockets of depressed incomes within a generally healthy industry.

(a) *Low-income commercial farms*

Although it is difficult from the statistics to exclude the residential and part-time farms which contribute relatively small amounts to the family income, it is evident from the census data and from surveys of farm earnings that there are many farms on which the family is wholly dependent and which, over many years, provide abnormally low incomes.

Some farms are so organized that, even with the most competent management, they are incapable of providing an average income under stable conditions of demand. If farm incomes in a particular area are generally and persistently low the main factor is likely to be inefficient and rigid farm organization. The factor limiting the effectiveness of farm organization is usually land. Given the productive quality of the land, the area incorporated in the unit is too small to effect a combination of other factors which will provide a normal income. In principle, the necessary action is a re-arrangement of land holdings and a reduction in the number of farms. This means the sale, rental or abandonment of some farms and their incorporation into others. The impediments to the process may be considerable. There is often a disposition to proceed from the assumption that the farm unit must remain inviolate, and that it is possible by changes in enterprises or in other aspects of organization to step up incomes to a satisfactory level. This is, too frequently, only wishful thinking. Given the market demands and the techniques, there is no way, other than income supports from other sources, by which net incomes can be significantly raised.

In the Prairie Provinces the pattern of land holdings set by the homestead legislation proved ill adapted to the variations in the productivity of land in different parts of the prairie region and to the emerging mechanical means of efficient crop production. Throughout the history of prairie agriculture a constant process of reorganization has gone on. The general effect of the process is evident in the steadily increasing size of farm unit, and the even more rapid increase in the acreage of improved land per farm. In contrast to the fluidity of land organization evident in the prairie region, experience in the Maritime Provinces reflects a high degree of rigidity. There has been little change from the pattern of tenure established a century or more ago. Abandonment of land and migration off farms have occurred, and indeed have taken place more rapidly in the Maritimes than in other parts of Canada. There is in fact a considerable mobility of people. But the small farm has persisted and



the level of farm incomes has remained relatively low. Both historical and geographical factors appear to place impediments in the way of adjustment of land holdings. In any case, persistently low incomes in the Maritime region are clearly associated with inflexible land organization, and it is difficult to escape the conclusion that no significant improvement in the level of farm incomes can be expected without substantial re-organization of farm units.

Other farms — and they are to be found in all regions and areas — yield a meagre income to the farm family because of relatively inefficient management. It is difficult to appraise the quality of management, and it seems to be impossible to determine objectively whether the general level of management in Canadian agriculture is rising, or how it is moving in relation to management skills in other industries. Among the many farm managers the degree of skill can vary greatly, and there will always be a substantial number of relatively poor managers. Improvement in management, at least among the less successful farmers, would help to reduce the problem of low income farms. In agricultural education, administration and extension, the emphasis has been on the technical factors; and this is necessary. However, more could be done to develop a management approach to the problems of the farm business. This would fortify those influences which are working in the direction of improved farm management practices and of raising the level of farm incomes.

Low incomes may themselves affect the level of management skills and contribute to the persistence of low incomes. When other opportunities are presented the alert youth on the farm may be the first to move to the more attractive alternatives. That this process of selection of the managers of the family farm has actually occurred cannot perhaps be demonstrated, but there is no doubt that the young people on farms are becoming more conscious of the alternatives open to them. It is a reasonable assumption that a prosperous agriculture will retain and draw to it the kind of persons who find a challenge in the demands of scientific farming.

In many parts of the country it is possible to find concentrations of impoverished farmers trying to make a living on relatively unproductive land. Not all farms can be located on the limited quantity of the best land. Some land is so poor that not even the most skilful organization and management would wrest a reasonable income from it. But between these grades there is no reason why the incomes remaining to farmers should vary with the quality or character of the land, unless, first, the prices paid for land are not in proportion to their capacity to produce net revenue; second, the choice of enterprises and the organization of land holdings are not properly adjusted to the optimum economic use of the land; and, third, under conditions as they are, poor farmers tend to be located in areas of relatively poor land. It is a matter of general

observation that the incomes of farmers on physically better lands tend to be higher than the incomes of farmers on physically poorer lands. The main reason is that the farms are not effectively organized in relation to the land resources on which they must rest. As a general rule the less productive the land, the larger the area which will be required to create an efficient unit. But stereotyped and obsolete arrangements for the distribution of land in holdings impede the kind of reorganization which is necessary if net farm incomes on poor land are to be adjusted upward.

Even in the most prosperous periods that agriculture has experienced, some farm incomes have been depressed because of the decline in the demand for the principal product they were organized to produce. This condition may be expected to recur in the future. In the complex industry of agriculture efficient production may require a substantial measure of specialization; or, as in the case of producers in Prince Edward Island, there may be one crop — potatoes — on which the farmers rely heavily for cash income. The nature of the specialization is dictated by the special combination of physical factors found in a particular locality, or by market relations. An area of concentration of production develops. Habits of food consumption are more stable than the tastes of consumers for many other commodities; but the demand for the product of a given area may decline because of changes in tastes and habits, the emergence and competition of new producing areas, or loss of markets for other reasons. The plight of the Nova Scotia apple producers provides an excellent illustration of this phenomenon. The problems of adjustment to declining demand are often acute, and a general and substantial loss of income creates a depressed area. If the markets are permanently lost, changes are inescapable. The readiness with which shifts can be made varies with the circumstances, including the investment associated with the specialized production and the alternatives open in the particular location. Difficult and complicated as the situation may be, the permanent solution seems to lie in the direction of reorganization of the farm business and re-establishment of the farms on a self-supporting basis.

*(b) Irregularity of farm incomes*

Incomes from commercial farms are highly irregular and uncertain in comparison with incomes from other businesses and occupations. Income fluctuations in agriculture occur as the result of the same factors affecting other parts of the economy; in addition there are certain elements peculiar to agriculture (and some other primary industries, for example fisheries). The special causes of income fluctuations in agriculture are of two kinds; first, unplanned and unpredictable variations in the physical volume of output; and second, profit expectations and the responses of farm producers. The first feature, unplanned variation, results from the substantial dependence of agricultural production on uncontrollable physical

and biological processes. The second feature, the expectations and responses of producers, results from the structure of the industry, which is one of a large number of producers acting independently on incomplete information.

The relations between these two elements and incomes varies with different forms of production. Particular crops may be more vulnerable than others to unplanned variations associated with weather. There is a noticeable difference in the effects of producer responses between the various types of stock. This merely serves to emphasize the difficulty of dealing with the entire variety of conditions found within the complex industry of agriculture.

### *(i) Unplanned irregularities of output*

It is not possible to deal with all the different situations and products affected by unplanned irregularities. The problem can be well illustrated by reference to wheat production, which is largely confined to the prairie region.

Even when the acreage seeded to wheat remains substantially unchanged, the total output of wheat in the Prairie region varies greatly from crop year to crop year. Although a considerable amount of work has been done in studying the causes of yield variations, no reliable basis has yet been discovered for predicting the occurrence of good and bad seasons. There is an unavoidable risk. Fluctuations in total output have an effect on price; but the effect on total revenue depends on the nature of the market and of demand in the market. Wheat production is geared to the export market, but there are other major exporting areas in the world. Consequently, variations in wheat production in Canada may have only minor effects on prices in the export markets (which are also affected by the policies of importing countries). In general, if Canadian output is low, the aggregate income of producers is low. However, the incidence of low yields is never uniform over the whole producing region. In years of generally low yields some areas, and some farms, experience normal or high yields. In years of generally high yields, some areas, and some farms, experience normal or low yields.

Because wheat can be graded and stored, there is a possibility of regularization of sales from season to season with the object of reducing price fluctuations and stabilizing incomes. Regularization might be carried on by the individual farmer. The concept that a high yield includes a surplus which is an advance on the inevitable low yield which will follow at some time is a useful one. But it is too much to expect that, among the large number of producers, many of them would be prepared, voluntarily, to accept the risks involved in regularization of sales. It can be argued that the collective assumption of the risks can contribute to a reduction of the basic problem of income irregularities. This, however, may require some centralized marketing agency.



Unfortunately, the operation of a regularization programme is complicated by the possible, and indeed probable, simultaneous occurrence of other factors which also affect output and prices. Thus output may be above normal in a particular season because of the effects of increased acreage and high yields; and the price at which a given quantity can be sold may be affected by a temporary, or permanent, shift in demand, particularly the demand for Canadian wheat. The degree of success to be expected from the marketing of a given product through a central selling agency is therefore clearly limited.

The experiences of the Canadian Wheat Board in the last few years admirably demonstrate the difficulties with which such an organization must be confronted. It is true that the Board is primarily a selling agency. It must accept all wheat and coarse grains offered for sale, and it is charged with the responsibility of selling the grain committed to it at the best possible price. But this responsibility involves decisions which inevitably introduce the element of regularization and the risks associated with it. It is a gross simplification of the problem with which the Board is confronted to say that it must decide whether some of the crop produced in a particular year will not command a better price if it is sold after another crop has been harvested; and yet perhaps this is the essence of the problem. That the Board has performed its duties in a responsible and efficient manner does not seem to be seriously questioned in any quarter; and yet surpluses have continued to accumulate to an embarrassing point. It is impossible to determine precisely why this has occurred. Physical conditions over the past few years have been unusually favourable and yields per acre in Canada and elsewhere have been above the long-term average. This is the sort of situation in which surpluses should be accumulated against the inevitable occurrence of years of low yields. However, it is possible that the high yields recently experienced may be due in part to the effect of new production techniques which are gradually raising the long-time average yields. There is no possible way of accurately anticipating, or of measuring, the effect of this factor.

Over the 25-year period with which this study is concerned there will be times when, because of weather conditions, yields of wheat in western Canada will be relatively high, and there will be other times when, for the same reasons, yields will be relatively low. Without some procedures aimed at regularization, the problem of sharp income irregularities would be acute. Selling through a centralized agency does not eliminate the risks, although it may shift the burden of them. It is entirely possible that, even under the most skilful operation of the marketing agency, stocks will, from time to time, accumulate to the point at which the possibility of additions must be viewed with alarm. At this point, if there is no apparent inclination on the part of producers to plan a reduction in output, action designed to induce this response might be considered



appropriate. There are many ways in which the inducement could be provided. The particular procedure best suited to achieve the desired results would depend upon all of the factors operating at the time. The simplest procedure, and one which might be followed under any circumstances, would be for the selling agency to announce, in advance of seeding the next crop, that it would guarantee to accept only a specified quantity of wheat during the next marketing year. Such action would leave it to each individual producer to decide what he would do in his own circumstances. How far this would accomplish a cut-back in seeded acreage would depend on the kind of alternatives available at the time. Other procedures might be preferred under particular conditions. For example, if the acreage of summer fallow, at the time, were not unusually large, farmers might be induced to increase the area under summer fallow. Or, again, if the markets for alternative products were strong, action might be taken to divert wheat acreage to other crops. The point is that there is no single course of action which would be equally effective under all circumstances.

As was pointed out above conditions of wheat production in the prairie region are such that even in a good year some farmers will experience low yields; and in a poor year some farmers will have high yields. Centralized marketing techniques aimed at regularization, while they may be successful in smoothing out the income effects or irregularities in aggregate output, can go only a limited distance in stabilizing the incomes of individual producers. In principle, crop yield insurance offers another method of evening out fluctuations in income due to unplanned variations in output. An all-embracing crop yield insurance plan would meet the problems of individual producers more effectively than is possible through centralized marketing alone. The possibilities of crop yield insurance for prairie farmers have been investigated on a number of occasions. Although insurance appears now to be well established in the United States, there has been no Canadian plan or proposal which has met with support in this country. The difficulties of implementing a plan are considerable. To make the risks measurable, more complete records of yields than we now have would be needed. Without substantial subsidization, premiums in high-risk areas would have to be so high as to appear prohibitive; in areas of more stable yields the need is hardly sufficient to warrant the elaborate administrative machinery which would be required. Pooling of risks and premiums would mean supporting production in high-risk areas at the expense of producers in low-risk areas. Hail insurance is now well established. Premiums vary with the measurable risks. In some areas, where hail is a major hazard causing yield variations, insurance against this risk can make a substantial contribution to the stabilization of incomes.

Arrangements under the Prairie Farm Assistance Act have been devised to support incomes, in the areas most subject to drought, in years in which low yields have been experienced over a significant acreage. The procedures do not involve elaborate inspection machinery, administrative costs are low, and the annual burden on the federal treasury is not heavy in relation to the assistance given. All shippers of grain make an annual contribution to the fund. However, producers in areas of relatively high and stable yields rarely, if ever, receive any benefits. On the other hand, in some areas of relatively low and variable yields, benefit payments have been received almost continuously from the inception of the plan.

A considered view of the prospects for Canadian agriculture leads to the conclusion that over the long pull conditions will be favourable. There is probably no way, or at least no acceptable way, by which the individual producer can be relieved of all the risk inherent in the environment in which he has to operate. But, if incomes generally are at a higher level, the capacity of the individual farmer to carry any part of the risk will be increased. Moreover, the anticipated change in the balance of production, with greater diversification through increased livestock production, will help to stabilize incomes generally in the rural areas of the western Provinces. However, years of fairly widespread distress can be expected. Too much water in the seeding period, not enough water or epidemics of disease during the growing season, general frosts prior to harvesting or early snow before harvesting is completed — any of these may, at some time, leave a substantial proportion of farmers without income or the means to produce another crop. Even if incomes can be expected to vary around some more satisfactory level, the periodic occurrence of disaster conditions can overtax the resources immediately available to large numbers of farmers.

(ii) *Producers' expectations and production responses*

Commercial farmers, like their counterparts in other industries, are directed in their production plans by price relations and expectations of profits. But there is an important difference between agriculture and many other industries in the manner in which supply is adjusted to changes in the factors affecting profitability. In industries in which the number of producing units is small, or in which a few large producers are responsible for most of the output, plans to expand output, where the conditions seem favourable to expansion, are tempered by the knowledge that competitors will also be planning to increase production. Indeed, in many situations, final plans of particular producers are evolved within a framework of information respecting the plans of others. Under these conditions the possibilities of over-expansion are reduced. The situation is different in an industry consisting of a large number of small producers,

each planning production independently. The record of experience is that, in this type of industry, there is an inherent tendency to overshoot the mark in production. Farmers expect a particular form of production, for example, hogs, to be profitable. They may be unduly influenced by the immediate profitability. They proceed with their plans to increase output, but when, in due course, the increased supply comes on the market, it is apparent that production has been expanded too greatly, the prices realized result in less profit than expected, and there is a general tendency to cut back sharply on production. The process of recurrent expansion and contraction is self-perpetuating. The possibilities of aggregate and cumulative error in both expansion and contraction vary with the length of the production period and other technical factors, for example, prolificacy in the case of livestock, which affect the rate at which production can be increased.

By reason of the variety of factors which determine total profits, the cyclical tendency is a complex phenomenon; and there is danger in viewing it in an oversimplified manner. There is statistical evidence that the relation between the prices of coarse grains, particularly barley, and hog prices is an important determinant of the plans of producers to expand or contract production. If hog prices are high in relation to barley prices, hog production tends to expand. Eventually this brings about a decline in hog prices, the barley-hog price ratio is reversed, and production is contracted. However, there are many other factors which enter into the farmers' expectations of the relative profitability of hog production. They include other elements of cost, labour, for example. Moreover, the movements of other livestock prices, for example, beef prices, do not follow the same pattern as hog prices. Consequently, even if it were possible to determine, at any time, an equilibrium relation between barley and hog prices, and to maintain such a relation, this would not assure stability of production and incomes. Furthermore, it is extremely difficult to establish the effect of changes in the relation between input prices and product prices on total farm profits. The effect depends upon the composition of farm costs — overhead costs, imputed costs, joint costs — and the relation between output, margin of profit per unit of product and total profits.

The problem of cyclical tendencies may be viewed as primarily one of incomplete information available to farmers. Thus, if individual farmers were better informed on the forces operating in, and behind, the current market prices, and particularly on what is happening on farms generally, it might be supposed that this would help to minimize the fluctuations. There is a good case for supplying information and outlook services to agriculture. At the same time they have fairly obvious limitations. Organized marketing agencies could, with sufficient producer support, exercise some effective influence on the extent of the fluctuations, through advice, direction and even regulation. However, the case for organized marketing agencies



cannot be judged solely on the contribution they might be expected to make to reducing cyclical tendencies.

(iii) *Price supports*

Commodity prices perform three distinct functions. First, prices ration the amount produced among buyers. A higher price will tend to reduce the quantity which can be sold; a larger quantity can be moved at a lower price. Second, prices serve to direct production. A higher price will tend to induce an expansion of production; a lower price will discourage output. Third, prices distribute incomes. Given the quantity produced, a higher price will provide the producers with higher incomes; a lower price will reduce incomes.

The practice of regulating prices presents problems of reconciling the effects of price in the three directions. Thus a price which may be established with a view to its income effects may fail to reconcile the quantity which will be produced with the quantity which can be sold at the price. If the regulated price is such that more will be produced than can be sold at a single price, the problem could, in principle, be resolved by various devices. First, production, or at least sales off farms, might be restricted to the quantity which can be sold. In this event the total effect on the incomes of producers would depend upon a number of factors in the particular situation. Second, the difference between the regulated price paid to the producer and the price at which the quantity brought forward by producers could be sold might be made up from public funds. The extent of the public funds required, in a particular situation, would depend upon a number of factors. Third, it is possible, under particular circumstances, that the total revenue obtained from sales could be increased, and might even be raised to the amount distributed in incomes, by differentiating between buyers, that is, by introducing another system of rationing the quantities available. A programme of government price supports designed, at any time, to sustain producers' incomes at a level higher than they would otherwise be would necessarily at the first stage involve the second device. The third device may be employed in the actual sales programme, and would affect the total support required. Further, if the government wished to do so, it could take action to limit production or sales off farms.

In some situations — for example, the production of fluid milk for a particular market — regulation of quantity is relatively easy; and, in this case, with price differentiation between alternative uses (fluid milk and butterfat), prices to producers and buyers can be established without the injection of public funds. However, in many situations, the control of production or of sales off farms presents serious administrative difficulties. For example, because of the wide range of circumstances in which the production of butterfat takes place, the allocation of quotas would of necessity be highly arbitrary; this would inevitably increase the



problems of administration and control. Further, production quotas tend to be inflexible and to introduce rigidities which impede desirable adjustments, resulting in a less efficient production of the commodity. These are strong arguments against the attempt to regulate production on individual farms. With regard to the control of sales off farms, there are limitations in the application of marketing quotas as well. For example, establishing marketing quotas for individual producers may leave them with the problem of holding excess stocks. However, it does leave to the individual producer the decision regarding the production adjustment appropriate to his own situation. This introduces some flexibility in production adjustments and may reduce the extent of inefficient production.

There are two principal ways in which the gap between a supported price and the price at which the product would otherwise be sold can be filled in from public funds. First, the government might stand ready to purchase, at the support price, all quantities offered to it. This would establish the support price as a fair price. The quantity which would come into the possession of the government would depend upon the relation between the support price and the price which would have prevailed if the government had not been a purchaser. Once the government had acquired stocks, it would be faced with the problem of disposing of them. Second, the government might refrain from purchasing stocks. In this event the market price would fall below the support price. The government could pay to the farm sellers the amount of the difference between the actual market price and the support price. There would be no accumulation of stocks. Both methods — government bulk purchasing (butter) and deficiency payment (apples) — have been followed under the Agricultural Prices Support Act. The immediate income effects are the same under both methods. The effects on production may be significantly different. By allowing the market price, which will clear the quantities being brought forward, to be established, the deficiency payment method may provide more inducement to producers to curtail production than if the higher support price becomes the market price under the bulk-buying method. At least under this arrangement producers can be conscious of the price which would prevail in the absence of continued support. The effects on the public treasury, that is, the total amount of support provided out of public funds, will depend upon the sales policy presented by the government and upon the effect of government-held stocks overhanging the market. Consequently, the ultimate effects (on incomes, production and subsidy) are difficult to judge.

Within a policy of support prices the government can, with or without bulk purchasing, introduce a system of multiple prices for the commodity. The two-price system is the simplest form. It can be pursued in various ways, depending on the nature of the market differentiation practices. Thus, within the domestic market, quantities may be disposed of to special

groups of consumers, for example, charitable institutions, school children, indigents or low income families, at prices below the support price. Or again, quantities may be sold, on the export market, at prices below the support price maintained in the domestic market. (This procedure involves dumping in the technical sense, and raises problems of international trade which are beyond the scope of this study.) If the government maintains its support price by bulk purchasing and selling, the revenue it will secure and the direct cost to the treasury will depend upon the outcome of its attempts to pursue a multiple price system.

There can be no need to stress the difficulties inherent in the procedures for price supports, the uncertainty of the immediate results, or the even greater uncertainty of the ultimate consequences. Experience in the United States and elsewhere, and limited Canadian experience under the Agricultural Prices Support Act, provide ample evidence of the difficulties. The decision to embark on support measures must largely depend on the recognition of a need for some action to give immediate support to the incomes of farm producers, and, presumably, on some consideration of alternative means of accomplishing the same end. Should the need appear urgent, assistance based upon price has the merit of allocating the aid in proportion to production (or sales) and therefore in some direct relation to the impact of low prices on net incomes.

Assurance of support of prices at a high level would significantly influence production decisions, involve substantial contributions from public funds and create immense problems of disposal. This is clear from the experience in the United States. It is also clear that built-in formulas for determining the level of support, for example, parity formulas, have certain aspects in principle which are likely to create serious difficulties in practice. The difficulties arise from the complexity of the elements which enter into the determination of costs, prices and profits. These elements, even if measurable, are not constant. Consequently, formulas devised on a historic base may be a poor guide to appropriate action at some later time.

Since it may be expected that, from time to time, the market prices of particular farm products will tend to fall far enough to create seriously depressed incomes, and since other appropriate means of supporting incomes will probably not be available, it can be argued that the government should stand ready, under the necessary legislation, to sustain incomes by means of price supports. However, the level at which support prices should be set and the particular techniques to be used should be determined in the light of all the conditions obtaining at the time. The decisions involved should be based upon the fullest possible knowledge of the circumstances. The emergency conditions may develop at any time, and prompt action may be required. These considerations suggest the need for machinery to keep conditions affecting the prices of particular commodities under constant and careful study.

## *Appendix A*

### *Chapter 2*

#### **THE DEMAND FOR CANADIAN FARM PRODUCTS<sup>1</sup>**

Data used in projecting the domestic demand for farm products were:

- (a) Official statistics of rates of disappearance of food per person in Canada for the years 1935 to 1955, inclusive.
- (b) Statistics of real disposable income per person (in constant 1949 dollars) in Canada for the years 1935 to 1955, with projections at five-year intervals to 1980, provided by the Commission staff.
- (c) Canadian population statistics 1935 to 1955, with projections at five-year intervals to 1980, also provided by the Commission staff.

Items (b) and (c) were developed in other studies of the Commission, and are not elaborated upon here. With respect to item (a), certain observations and comments are presented regarding the quality and limitations of existing data as a guide to interpretation of the findings in Chapter 2, and, to some extent, in Chapters 4 and 5.

In an analysis of the relation of changes in income to changes in the rates of food consumption over a period of time, the greater the number of years included, other things being equal, the greater the confidence which may be placed upon the results. Length of period in years is of special importance when marked shifts have occurred in rates of real income and in rates of consumption.

The availability of comparable statistics on Canadian rates of food consumption was the factor determining the period covered in this study,

<sup>1</sup> This appendix is intended to be an explanatory supplement to Chapter 2, "The Demand for Canadian Farm Products", more especially to Section 1.

1935 to 1955. The official food consumption statistics were developed originally within a framework of concepts and by methods outlined in the report of the Consumption Levels Inquiry of the Combined Food Board,<sup>2</sup> made during World War II. Apart from small refinements and changes made since then, the preparation and presentation of annual estimates of food consumption per person follow the pattern of the Consumption Levels Inquiry.

In recent months, work has been undertaken by the Dominion Bureau of Statistics in co-operation with other agencies of the federal government to make available comparable food consumption data back to and including 1926. While data for these additional years might modify somewhat the consumption rates projected in this Commission study, it is not likely that these rates would be affected materially and quite unlikely that the direction of change in the projected rates would be altered. This confidence is based upon selected comparisons of the projected estimates of food consumption rates for Canada with similar statistics and projections made for the United States<sup>3</sup> for which reasonably reliable consumption data going back as far as 1910 were used. This matter is referred to in some detail in a later section of this appendix.

The consumption estimates are derived from or built upon the series of production statistics of the food and non-food processing industries, of imports, exports, stocks and a number of special calculations and estimates for uses or disappearance in wastage, seed, feed and so forth. Many of the items are computed in terms of retail weight, while others are in terms of a raw or semi-processed state. No single term is wholly appropriate for and fully descriptive of this series of statistics. Through this writing and that of Chapter 2, the term consumption has been used. The official release<sup>4</sup> carries the caption "Apparent per Capita Disappearance of Food in Canada". The figures, however, variously pertain to disappearance at the retail, wholesale, processing and even home production levels or stages. However, this is not of material consequence, since for each category, and each item within a category, consistency of the level or stage has been maintained over the period under survey. The variations in form and stage between categories and items gave rise to a number of conversions at a further point in the analysis when it became necessary to translate consumption data into production equivalents.

While statistical accuracy for the absolute rates of consumption varies from category to category and item to item, the year-to-year reliability of

<sup>2</sup> *Food Consumption Levels in the United States, Canada and the United Kingdom*, Report of a Special Joint Committee set up by the Combined Food Board.

<sup>3</sup> Rex F. Daly, *The Long-Run Demand for Farm Products*, *Agricultural Economics Research*, Vol. VIII, No. 3, July, 1956, United States Department of Agriculture.

<sup>4</sup> D.B.S., *Apparent per Capita Domestic Disappearance of Food in Canada*, Special Statement, November 5, 1956.



both categories and items is relatively satisfactory. As would be expected, reliability is highest for those items in which the major portion of total consumption is recorded statistically at some stage in the distribution system. The reliability is sharply lower for those items in which a larger proportion of the product moves almost directly into consumption. This applies to home-produced foods and to commodities marketed directly by farmers to consumers.

Graphic methods were used to determine the influence of real disposable income upon the consumption rates of each food and beverage item. The rate of consumption per person for each item for each year was plotted against real disposable income per person for the same year. To the scatter, a line of regression was fitted and then projected to 1980. Using the Commission projections of real disposable income per person, at five-year intervals to 1980, the rates of consumption were read off at each of the intersecting points on the regression line.

In fitting a line of regression for each food item, certain factors other than income which had operated to distort or warp the food consumption pattern during the 1935-to-1955 period were taken into account. In many instances the consumption rates were affected by unique conditions of the war and immediate postwar years. These included such factors as the rationing and allocation of supplies, exchange control and the abruptness of the gains in real income per person.

The influences of these factors were shown in departures in food purchasing and consumption habits during the 1940-to-1945 period and even into 1946 and 1947. The sharp gains in real income per person during the early years of the war were reflected in increased purchases of those foods which were unaffected by rationing, allocations or shortages. As incomes rose, total food intake per person rose above the prewar depression levels, and rates of consumption for foods having a longer run negative income elasticity showed surprising positive departures from trend. Substantial positive deviations from the lines of regression occurred for cereals including wheat flour, potatoes, poultry meat and eggs, certain fats and oils, red meats, syrups and sugars other than cane sugar, starch, pulses and nuts and fluid milk. There are various explanations for deviations of these items. Restricted supplies of consumer goods played a part in concentrating expenditure on foods and this expenditure was directed into items which were readily available and which were mostly of Canadian supply. This partly accounted for the relatively high demand for cereals, potatoes and pulses and nuts. Although red meats were under ration, the allowance per person was generous and consumption per person first increased and thereafter was well maintained at the new levels. The submarine warfare of the central and south Atlantic together with the rationing programme restricted cane sugar consumption but led to substantial uptake of sugars and syrups of other than cane origin. The

consumer subsidy on fluid milk, which held down price increases while incomes were rising, led to more than anticipated rates of consumption from 1942 through 1947.

In contrast, coffee and tea consumption rates under rationing were held below rates which might have been expected in view of the increase in income. Citrus fruit, the supply of which was affected by exchange control, did not show a rate of increase commensurate with income gains.

The foregoing suggests the nature and effect of some of the forces operating upon Canadian food consumption patterns during part of the 1935-to-1955 period. As a consequence, wherever necessary, allowances were made for these obvious departures when fitting a line of regression.

With few exceptions, straight-line regressions were applied. The exceptions in which the slope of the projected line was adjusted were:

Citrus fruit

Milk solids (condensed milk, milk powders and ice cream).

The marked response of citrus fruit consumption to the rise in real incomes has been due in considerable part to the increase in consumption of fruit juice, including the concentrate forms. Since this response coincided with the technical innovation of concentrate processing, it was considered that the regression probably would be less steep in the future and the rate of increase was reduced for the projections to 1980.

Some of the milk products referred to also have been subject to technical developments in processing, especially powdered and condensed milk. The process of substituting powdered (whole and skim) milk in several uses proceeded at an unusually rapid rate in the postwar period, especially after cessation of the subsidy on fluid milk. It was assumed that the rate of substitution would diminish, and projected consumption rates were adjusted downward accordingly.

Projection of rates of consumption for the various items in the "red meat" food category involved a departure from the standard procedure described earlier. As stated in the text of Chapter 2, food consumption rates for any one item in a particular year may vary considerably from trend or normal. These variations are caused in the main by changes in the supply and in this regard the more perishable foods are more sensitive to these influences. This is particularly so for meats and especially for pork, because hog production fluctuates relatively quickly as market conditions change. On the demand side, likewise, consumers adjust purchasing habits relatively speedily in response to price changes among the various meat items, and usually quite rapidly as between the price changes for cuts of pork and beef. This response is described technically as "cross elasticity of demand".

Because of the complexities introduced by fluctuations in supply which are reflected in variations in rates of consumption, the following modifications of methods were applied to arrive at the projected estimates of red meat consumption. In Canadian food disappearance statistics, "red meats" comprise the following items: pork, beef, veal, mutton and lamb, offal and canned meats. These items were totaled for each year and the resulting total red meat consumption per person was plotted against the appropriate real disposable incomes per person for each year. From the regression, projections of total red meat consumption were then read off at five-year intervals to 1980.

Because the purpose of estimating future consumption rates was to determine production requirements, it was only necessary to estimate consumption rates for the meat items by source category, i.e., pork, beef, veal and mutton and lamb. Thus, in the projected consumption rates, the canned meat and offal items would be represented within the totals in terms of their major meat source.

Veal is almost entirely a joint product of the dairy industry. The future supply of veal therefore was derived from projections of the number of milk cows which in turn had been determined in relation to total milk requirements in the years through 1980. Veal consumption per person was derived from the expected veal calf output and then deducted from total red meats.

Canadian food disappearance statistics do not show the consumption of lamb separately from mutton. From prewar to 1952 there was steady decline in the rate of consumption of these two meats combined. Although there has been a slight recovery in recent years, there are no indications of a marked recovery.

Some consumer surveys indicate a moderately high positive income elasticity of demand for lamb as such. However, when considering future consumption of mutton and lamb combined, account must be taken of the general position of the sheep raising industry. Mutton is a joint product with wool and the decline in wool production over the years has affected the output of mutton. Wool has faced severe competition from other natural and man-made fibres and developments in this direction yield little ground for expectations of substantial increases in wool production.

Accordingly, in projecting the future consumption rates for mutton the long-term downward trend was arbitrarily levelled out around 1965 and a constant consumption rate was projected through 1980. The projected consumption data for mutton and lamb were then deducted from the red meat total (already less veal).

The residual quantities of future red meat consumption, representing the bulk of the total, were therefore beef and pork. It is between these two meat sources in which cross elasticity of demand is of greatest consequence.



In the past in Canada, beef consumption has tended to be high relative to pork. However, over a period of thirty years pork consumption has been gaining relative to beef. This statement may seem inconsistent with recent meat consumption experience when beef consumption per person has been exceptionally high. This, however, is a result of a high point on the beef production cycle. The longer-run relationships are not reflected in the current statistics.

The consumption rates for both beef and pork were plotted against time and trend lines fitted. These trends were projected and gave indications of a further substantial gain in pork consumption per person relative to beef. In examining these trends, it was apparent that in recent years, the gains in efficiency of pork production had proceeded at a relatively rapid rate and that this rate would hardly be maintained during the whole of the twenty-five year period ahead. The trend line for pork was therefore flattened around 1965 and projections of consumption rates for both beef and pork were read off for subsequent five-year intervals to 1980. The results suggested a rate of beef consumption in 1980 slightly higher than in more recent years but accompanied by a pork consumption rate considerably higher.

Apart from the increase in total volume of food intake per person which followed the early income gains over prewar depression levels, total food volume by weight has maintained a relative constancy, year by year. It was assumed, therefore, that a relative constancy in the total weight of the projected ratio of consumption per person might be expected to continue. The projected rates for all items were totalled and an upward trend was corrected by a prorated downward adjustment over all items. These downward adjustments progressively increased, amounting to just over 6% for the 1980 projections.

### ***Translation of Projected Food Consumption Rates to Total Requirements***

The adjusted projected rates of food consumption were multiplied by the projected total population at each five-year interval through 1980. The resulting product expressed total domestic requirements in the form of product, that is to say, retail weight, carcass weight, and so forth, as given in the basic source material. With domestic requirements as a starting point, balance sheets were constructed for each of the main items leading back to a production requirement. This process took into account estimated quantities required for export and quantities of imports, quantities for industrial use and for waste seed and feed, where these were significant amounts. The balance sheet figures for each item were converted to farm production equivalents to provide estimates of total requirement in terms of farm output for each item for specified years in the future.



### *Limitations to Use of National Average Consumption Data*

Not infrequently, the official national food consumption averages are applied to food requirement analysis or projections for a locality or a province. The results from this practice are unreliable and may lead to quite incorrect conclusions. A national average rate of consumption for any food item is a convenient summary form for expressing food intake and it provides some useful national and international comparisons. However, a national average does not reveal the variety of food consuming habits within and between regions in Canada.

A considerable number of special surveys and studies disclose food consumption patterns by cities, by areas, for particular products and so forth. But, generally, these follow no particular plan or schedule<sup>5</sup> and hence are of only limited usefulness in adjusting national averages to regional or other situations.

### *Comparison of Present and Projected Food Consumption Rates, Canada and the United States*

It would not be unexpected that, for many food items, trends in demand in Canada are similar in direction to trends in the United States. However, as a rule, changes in rates of food consumption in Canada lag several years behind those in the United States. While the main pattern of consumption rates is similar in the two countries, there are significant differences in individual items. These result from a variety of causes, but comparative levels of personal income and the types of food produced in each country are dominating influences.

Differences in the basis of food consumption measurement and in the official statistics in the two countries make it difficult to obtain a satisfactory direct comparison for all food categories and items. In general, however, the present (1955) United States rates of consumption are higher for fruits, vegetables, eggs and red meats, somewhat lower in dairy products and much lower for potatoes and cereals. These differences, for the most part, carry over into projections of consumption rates. A comparison of present and projected rates of food consumption for selected items is presented in Table A1.

The purpose in presenting this comparison is to indicate the direction of projected changes in food consumption and the approximate magnitudes of these changes in the two countries. The adjective approximate is purposely used here because it will be noted that the specifications for each food category differ in the two countries and also because the food consumption rate for a single year for any item or even a category of several items may depart considerably from the normal or expected rate.

<sup>5</sup> The consumer expenditure surveys of D.B.S. are an exception. These are referred to in the Commission study, *Consumption Expenditures in Canada*.

Table A1

# RATES OF FOOD CONSUMPTION, SELECTED CATEGORIES CANADA AND THE UNITED STATES<sup>a</sup>

Product	Specification	Canada			United States		
		Actual (1955)	Projected (1980)	Percentage change	Specification	Actual (1955)	Projected (1975)
Cereals	retail weight.....	161.9	124.4	-20.7	grain equivalent.....	186.0	160.0
Potatoes—white	retail weight.....	144.4	109.6	-24.1	— <sup>b</sup>	101.0	85.0
Sugar-cane and beet	refined weight.....	99.2	96.5	- 2.7	— <sup>b</sup>	96.3	93.0
Fruit	fresh equivalent <sup>c</sup> .....	190.7	215.5	+13.0	farm weight equivalent.....	199.0	237.0
Vegetables	fresh equivalent.....	131.5	145.0	+10.3	farm weight equivalent.....	207.1	240.0
Red meats	carcass weight.....	151.5	169.5	+11.9	carcass weight.....	161.2	173.0
Total milk	milk equivalent <sup>d</sup> .....	1,036.2	920.0	-11.2	fat solids basis.....	700.0	720.0
Fats and oils	retail weight <sup>d</sup> .....	49.5	49.7	+ 0.4	food (fat content).....	45.0	45.5
Poultry meat	retail weight—dressed <sup>e</sup> .....	29.7	33.0	+11.1	eviscerated weight <sup>f</sup> .....	25.9	32.2
Eggs	retail pounds.....	36.0	45.0	+25.0	number.....	366	403
							+10.1

<sup>a</sup> United States data from *The Long-Run Demand for Farm Products*, Rex F. Daly, *Agricultural Economics Research*, Vol. VIII, No. 3, July 1956, United States Department of Agriculture.

<sup>b</sup> Not stated.

<sup>c</sup> Tomatoes included under vegetables.

<sup>d</sup> Including butter.

<sup>e</sup> All poultry.

<sup>f</sup> Chickens and turkeys only.

The more general conclusions to be drawn from the comparison are that:

- (a) A considerably greater proportion of the fall in consumption rates for cereals and potatoes has already taken place in the United States.
- (b) A relative stability in consumption rates for sugar, fats and oils is projected for both countries.
- (c) Relatively comparable percentage increases are projected for fruits, vegetables, red meats and poultry meat.
- (d) There is a major difference in the projected change in per person rates of total consumption of dairy products expressed in milk equivalents. Most of this difference is attributable to a projected decline of about 25% in the per person rates of butter consumption in Canada. This decline has already occurred in the United States, where the butter consumption rate now appears to be fairly stable.

It was suggested previously that the lag behind the United States in adjustment of Canadian food consumption rates for a number of items is attributable in part to the lower levels of disposable income per person in Canada.<sup>6</sup> Insofar as available, projections of personal disposable income indicate that a similar disparity, although possibly somewhat less in degree, may prevail in the period around 1975 to 1980. This lends general support, therefore, to the relative levels of the projected food consumption rates for the two countries.

### *Improvement of Canadian Food Consumption Statistics*

The official national data used in this analysis represent, for the most part, derived statistics. This is in the sense that the consumption rates represent residual or specific statistics resulting from re-arrangements, compilations and computations of a large number of more or less regular statistical series. For this reason, the improvement in the reliability of food consumption data depends primarily upon the improvement of statistics basic to the compilation and computation processes.

As pointed out, however, there are some items of significance in total consumption, where, because of the difficulties of enumeration or collection of data, the reliability of the consumption rate determined leaves something to be desired. This has particular reference to farm and urban home garden vegetable and fruit production used directly in the household and to food supplies sold directly by farmers to consumers. In the latter case, a considerable proportion of some items is taken care

<sup>6</sup> See the chapter "Comparisons of Income, Production and Growth in Canada and the United States" in the Commission study entitled *Canada - United States Economic Relations*.

of in the total estimate of production and this, of course, emerges in the residual quantity as an over-all consumption estimate.

Material improvement in the usefulness of national average food consumption rates could be obtained through close integration of regular sample surveys of both production and consumption to:

- (a) Improve basic statistical series entering into the food consumption estimates.
- (b) Provide, in addition to national average rates, regional and provincial consumption rates per person, especially for food items where marked local differences in consumption exist.
- (c) Make possible further analysis of factors affecting variations in food consumption patterns at a given point of time as well as over time in different regions and for various groups, for example, persons on farms and persons in towns and cities, and so forth.



## *Appendix B*

### *Chapter 2*

#### **THE DEMAND FOR CANADIAN FARM PRODUCTS**

This appendix, which consists of three tables, is designed to provide additional statistical information relative to the subject matter of Section II, sub-section 1 of Chapter 2.

Table B1

## WORLD WHEAT ACREAGE 1935-39 — 1955-56

	(million acres)								
	1935-39	1940-44	1945-49	1950	1951	1952	1953	1954	1955 <sup>a</sup>
Argentina.....	15.8	13.8	11.4	13.0	6.8	13.8	12.3	13.5	—
Australia.....	13.1	10.1	12.7	11.7	10.4	10.1	10.8	10.5	10.6
Canada.....	25.6	22.5	24.7	27.0	25.3	26.0	25.5	24.3	21.5
U.S.....	57.3	54.0	17.0	61.6	61.5	70.9	67.7	53.7	47.4
Total <sup>b</sup> overseas exporters.....	111.8	100.4	119.8	113.3	104.0	120.8	116.3	102.0	79.5
Bulgaria.....	—	3.3	—	—	—	—	—	—	—
Hungary.....	—	4.1	—	—	—	—	—	—	—
Rumania.....	—	5.6	—	—	—	—	—	—	—
Yugoslavia.....	5.4	4.9	—	—	—	—	—	—	—
Poland.....	—	—	—	—	—	—	—	—	—
Other Eastern Europe.....	21.4	—	18.5	20.2	20.5	20.2	20.3	20.8	20.5
Total European exporters.....	26.8	17.9	18.5	20.2	20.5	20.2	20.3	20.8	20.5
Algeria.....	4.2	4.0	3.6	3.8	4.0	4.4	4.4	4.8	4.7
Morocco.....	3.3	3.6	2.6	3.2	3.3	3.5	3.3	4.0	3.6
Tunis.....	2.0	1.7	1.9	1.7	1.5	2.9	2.6	3.4	2.0
Chile.....	2.0	1.9	2.0	2.0	1.9	1.9	1.9	2.0	1.9
Uruguay.....	1.2	0.9	1.0	1.2	1.4	1.2	1.7	1.8	1.9
India.....	25.5	24.2	23.3	24.1	24.1	23.2	24.3	26.3	26.8
Pakistan.....	9.3	10.0	10.3	10.7	10.8	10.2	9.5	10.7	10.7
Total ex. European exporters..	47.5	46.3	44.7	46.7	47.0	47.3	47.7	53.0	51.6

<sup>a</sup> Preliminary.<sup>b</sup> Classification of countries into groups of exporters and importers follows the practice in W. Malenbaum, *The World Wheat Economy*, Harvard University Press, 1955.SOURCE: *The Wheat Situation*, Circular, Foreign Agricultural Service, United States Department of Agriculture.

Table B1 (Cont'd.)

	1935-39	1940-44	1945-49	1950	1951	1952	1953	1954	1955 <sup>a</sup>
	<i>(million acres)</i>								
Austria.....	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.6
Belgium.....	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5
British Isles.....	1.8	2.7	2.1	2.5	2.1	2.0	2.2	2.4	2.0
Czechoslovakia.....	—	2.2	—	—	—	—	—	—	—
Denmark.....	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Finland.....	0.3	0.3	0.4	0.5	0.5	0.4	0.3	0.4	—
France.....	12.6	11.3	10.4	11.2	10.9	11.0	10.4	11.1	11.3
Germany.....	2.8	—	2.3	2.5	2.7	2.9	2.8	2.7	2.9
Greece.....	2.2	2.3	1.9	2.1	2.4	2.4	2.6	2.5	2.6
Italy.....	12.5	12.5	11.7	12.1	12.1	12.0	12.8	12.1	12.3
Netherlands.....	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3
Norway.....	0.1	0.1	0.09	0.08	0.06	0.05	0.04	0.05	—
Portugal.....	1.7	1.4	1.7	1.7	1.7	1.8	1.9	1.9	1.9
Spain.....	10.2	9.3	9.6	10.1	10.4	10.6	10.6	10.7	10.9
Sweden.....	0.7	0.7	0.7	0.8	0.8	0.8	1.0	1.0	0.9
Switzerland.....	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total European importers.....	46.7	44.7	42.49	45.18	45.26	45.55	45.44	47.05	46.5
Egypt.....	1.5	1.7	1.6	1.4	1.6	1.5	1.9	1.9	1.6
South Africa.....	1.9	2.5	2.4	3.7	3.0	3.1	3.0	2.9	3.2
Japan.....	1.7	2.0	1.7	1.9	1.8	1.8	1.7	1.7	1.6
Korea.....	0.8	0.8	—	—	—	—	—	—	—
New Zealand.....	0.2	0.2	0.1	0.2	0.09	0.1	0.1	0.1	0.7
Total ex. European importers...	6.1	7.2	5.8	7.2	6.49	6.5	6.7	6.6	7.1
Turkey.....	9.0	10.2	9.4	10.5	12.0	13.4	15.8	15.8	16.3
Total world.....	247.9	226.7	240.6	243.0	235.2	253.8	252.3	245.2	—

<sup>a</sup> Preliminary.

Table B2

**WORLD WHEAT PRODUCTION 1935 - 55**  
(*millions of bushels*)

	1935-39	1940-44	1945-49	1950	1951	1952	1953	1954	1955 <sup>a</sup>
Argentina.....	221.8	234.6	193.7	213.0	77.2	280.5	227.8	282.6	177.6
Australia.....	169.7	113.5	177.7	184.3	159.7	199.0	198.0	166.6	200.0
Canada.....	312.4	422.6	366.3	461.7	552.7	687.9	614.0	299.0	500.6
U.S.....	758.6	926.0	1202.4	1019.4	980.8	1298.5	1169.5	969.8	916.8
Total overseas exporters.....	1462.5	1696.7	1940.1	1878.4	1770.4	2465.9	2209.3	1718.0	1795.0
Bulgaria.....	—	53.5	—	—	—	—	—	—	—
Hungary.....	—	79.8	—	—	—	—	—	—	—
Rumania.....	—	80.0	—	—	—	—	—	—	—
Yugoslavia.....	97.7	—	—	—	—	—	—	—	—
Poland.....	—	—	—	—	—	—	—	—	—
Other Eastern Europe.....	464.0	—	318.0	392.0	430.0	402.0	420.0	390.0	410.0
Total European exporters.....	561.7	290.3	318.0	392.0	430.0	402.0	420.0	390.0	410.0
Algeria.....	35.2	29.4	29.9	40.5	32.0	43.8	40.4	51.0	46.1
Morocco.....	23.1	25.4	21.8	29.0	30.8	29.4	40.9	46.4	34.8
Tunis.....	15.0	10.5	12.3	17.0	12.5	25.2	21.3	22.9	15.1
Chile.....	31.6	31.9	35.6	35.8	36.3	40.4	35.1	38.3	33.8
Uruguay.....	13.3	10.2	13.1	16.0	17.6	17.0	30.0	29.0	30.3
India.....	262.1	253.6	212.3	235.2	237.4	215.3	275.6	294.0	318.8
Pakistan.....	117.0	131.4	129.0	147.8	147.6	114.2	105.0	137.5	118.0
Total ex. European exporters...	497.3	492.4	454.0	521.4	514.2	485.3	548.3	619.1	596.9

<sup>a</sup> Preliminary.SOURCE: *The Wheat Situation*, Circular, Foreign Agricultural Service, United States Department of Agriculture.



Table B2 (Cont'd.)

(millions of bushels)

	1935-39	1940-44	1945-49	1950	1951	1952	1953	1954	1955 <sup>a</sup>
Austria.....	15.9	11.8	10.8	15.0	15.8	18.0	19.3	16.6	19.2
Belgium.....	15.9	17.8	14.7	20.1	18.8	20.8	20.6	20.8	25.0
British Isles.....	62.4	95.7	77.5	97.3	86.5	86.1	99.5	103.9	97.1
Czechoslovakia.....	—	50.0	—	—	—	—	—	—	—
Denmark.....	14.5	6.3	8.7	10.9	10.0	11.1	10.4	10.7	9.3
Finland.....	6.1	6.1	9.0	11.2	9.5	9.4	9.5	10.0	9.1
France.....	286.5	240.0	238.2	283.0	265.0	310.0	330.0	388.2	375.0
Germany.....	92.4	—	67.4	96.0	—	—	—	—	—
Greece.....	30.4	21.5	24.0	31.2	34.2	38.6	51.4	44.8	48.9
Italy.....	278.4	245.8	227.2	285.0	260.0	295.0	332.8	266.8	323.3
Netherlands.....	15.2	12.6	11.1	10.8	9.9	12.0	9.6	14.6	11.5
Norway.....	2.4	2.8	2.7	2.5	1.5	1.5	1.4	1.5	—
Portugal.....	18.4	—	14.2	21.0	21.3	21.3	25.4	27.5	14.1
Spain.....	158.0	103.0	116.7	125.0	175.0	170.0	125.0	180.0	150.0
Sweden.....	26.4	16.8	23.2	27.2	18.5	28.7	36.3	37.5	27.1
Switzerland.....	6.1	7.9	7.8	8.4	8.6	9.3	8.1	11.7	10.1
Total European importers.....	1029.0	838.1	854.0	1044.6	1047.2	1152.0	1195.4	1240.5	1241.7
Egypt.....	45.8	44.0	42.6	39.0	45.0	41.0	56.8	63.5	54.1
South Africa.....	16.0	15.6	15.1	26.1	25.6	20.3	21.2	19.8	24.4
Japan.....	50.0	52.2	34.3	49.2	54.8	56.5	50.5	55.7	54.0
Korea.....	10.2	10.2	—	—	—	—	—	—	—
New Zealand.....	7.1	8.2	5.2	6.3	3.9	4.5	4.8	4.6	2.8
Total ex. European importers...	129.1	130.2	97.2	120.6	129.3	122.3	133.3	143.6	135.3
Turkey.....	135.7	135.7	125.1	150.0	205.0	239.0	294.0	180.0	260.9
Total world.....	3815.3	3583.4	3788.4	4107.0	4096.1	4866.5	4800.3	4291.2	4439.8

<sup>a</sup> Preliminary.

Table B3

## AVERAGE WORLD WHEAT YIELD PER ACRE

	1935-39	1940-44	1945-49	1950	1951	1952	1953	1954	1955 <sup>a</sup>
Argentina.....	14.0	17.0	17.0	16.4	11.4	20.3	18.5	20.9	—
Australia.....	12.9	11.2	14.0	15.8	15.4	19.7	18.3	15.9	18.9
Canada.....	12.2	18.8	14.8	17.1	21.8	26.5	24.1	12.3	23.3
U.S.A.....	13.2	17.1	16.9	16.5	15.9	18.3	17.3	18.1	19.3
Total overseas exporters.....	13.0	16.9	16.2	16.6	17.0	20.4	19.0	16.8	20.3
Bulgaria.....	—	16.2	—	—	—	—	—	—	—
Hungary.....	—	19.5	—	—	—	—	—	—	—
Rumania.....	—	14.3	—	—	—	—	—	—	—
Yugoslavia.....	18.0	13.7	—	—	—	—	—	—	—
Poland.....	21.6	—	—	—	—	—	—	—	—
Other Eastern Europe.....	21.7	—	17.2	19.4	21.0	19.9	20.7	18.8	20.0
Total European exporters.....	20.9	16.2	17.2	19.4	21.0	19.9	20.7	18.8	20.0
Algeria.....	8.4	7.4	8.3	10.7	8.0	10.0	9.2	10.6	9.8
Morocco.....	7.0	7.1	8.4	9.1	9.3	8.4	12.4	11.6	9.7
Tunis.....	7.5	6.2	6.5	10.0	8.3	8.7	8.2	6.7	7.6
Chile.....	15.8	16.8	17.8	17.9	19.1	21.3	18.5	19.2	17.5
Uruguay.....	11.1	11.3	13.1	13.3	12.6	14.2	17.6	16.1	16.0
India.....	10.3	10.5	9.1	9.8	9.9	9.3	11.3	11.2	11.9
Pakistan.....	12.5	13.1	12.5	13.8	13.7	11.2	11.1	12.9	11.0
Total ex. European exporters...	10.5	10.6	10.2	11.2	10.9	10.3	11.5	11.7	11.5

<sup>a</sup> Preliminary.SOURCE: *The Wheat Situation*, Circular, Foreign Agricultural Service, United States Department of Agriculture.

Table B3 (Cont'd.)

## AVERAGE WORLD WHEAT YIELD PER ACRE

	1935-39	1940-44	1945-49	1950	1951	1952	1953	1954	1955 <sup>a</sup>
Austria.....	26.5	23.6	21.6	25.0	26.3	30.0	38.6	27.7	32.0
Belgium.....	39.7	35.6	36.7	50.2	47.0	52.0	51.5	51.5	50.0
British Isles.....	34.7	35.4	36.9	38.9	41.2	43.0	45.2	43.3	43.3
Czechoslovakia.....	—	22.7	—	—	—	—	—	—	—
Denmark.....	48.3	31.5	43.5	54.5	50.0	55.5	52.0	53.5	46.5
Finland.....	20.3	20.3	22.5	22.5	19.0	23.5	31.7	19.0	21.6
France.....	22.7	21.2	22.9	25.3	24.3	28.2	31.7	35.0	33.2
Germany.....	33.0	—	29.3	38.4	41.7	41.4	41.5	39.2	42.1
Greece.....	13.8	9.3	13.1	14.9	14.3	16.1	17.9	17.9	18.8
Italy.....	22.3	19.7	19.4	23.6	21.5	24.6	27.5	22.0	26.3
Netherlands.....	50.7	31.5	37.0	54.0	49.5	60.0	48.0	48.7	57.5
Norway.....	24.0	28.0	30.0	31.2	25.0	30.0	35.0	30.0	—
Portugal.....	10.8	—	8.4	12.4	12.5	11.8	13.4	14.5	7.4
Spain.....	15.5	11.1	12.1	12.4	16.8	16.0	11.8	16.8	14.9
Sweden.....	37.7	24.0	33.1	34.0	23.1	35.9	36.3	37.5	30.1
Switzerland.....	30.5	26.3	39.0	42.0	43.0	46.5	40.5	58.5	50.5
Total European importers.....	22.0	18.7	20.1	23.1	23.1	25.3	26.3	26.4	26.7
Egypt.....	30.5	25.9	26.6	27.9	28.1	27.3	29.9	33.4	33.8
South Africa.....	8.4	6.2	6.3	7.1	8.5	6.5	7.1	6.8	7.7
Japan.....	29.4	26.1	20.2	25.9	30.4	31.4	29.7	32.8	33.8
Korea.....	12.7	12.7	—	—	—	—	—	—	—
New Zealand.....	35.5	41.0	52.0	31.5	43.3	45.0	48.0	46.0	37.8
Total ex. European importers...	21.1	18.1	16.8	16.7	19.9	18.8	19.9	21.8	19.0
Turkey.....	15.1	13.3	13.3	14.3	17.1	17.8	18.6	11.4	13.8
Total world.....	15.4	15.8	15.7	16.9	17.4	19.2	19.0	17.5	20.3

<sup>a</sup> Preliminary.

## *Appendix C*

### *Chapter 4*

#### **TECHNOLOGY AND INCREASED OUTPUT**

### *Chapter 5*

#### **PROSPECTIVE CHANGES IN THE STRUCTURE OF CANADIAN AGRICULTURE**

The conversion of the rate of food consumption for each item into measures of the volume of farm production requirements was described in Appendix A to Chapter 2. The next step was to project the number of each of the various kinds of producing units on the farms necessary to provide the total output. This involved an examination of changes in output in relation to selected inputs for a number of the more important farm commodities as well as for the whole of the Canadian agricultural plant, past, present and future.

Projections of rates of output for the more important animal products, that is, meats, dairy products and eggs, were made on the basis of trends over the past 21 years insofar as comparable input — output data were available. The statistics on the output of meats from hogs, cattle and sheep over the 1935-to-1955 period are reasonably satisfactory and reliable. Data on breeding livestock and their fecundity are somewhat less reliable and hence the input measure used was an inventory figure, the total numbers of the various species of livestock on farms at a given date each year. This, though lacking in precision and clarity of concept, gave results in terms of a trend in yields per inventory unit which appeared realistic. Further, the results compare reasonably well with rates of increase of output in relation to breeding stock as revealed in United States statistics.

There are difficulties connected with measurement of changes in input — output relationships for meat production which are not incon-



siderable. The difficulties are least in the case of hogs. For this species, meat is the major and primary output item, with the second joint product, lard, being subsidiary. Further, pork is produced within a relatively short time period (about nine months from breeding to marketing) and thus statistical cut-offs at arbitrary time intervals do not materially affect input-output relationships.

In contrast, perhaps more than one half of the meat output from cattle is a by-product of the dairy enterprise. Under these circumstances, it is almost impossible to segregate the inputs or portions of inputs which are directed to meat from those which are directed to milk output. The production of meat from cattle (except veal) is a long-term process and statistical measurement of the input-output relationships is subject to variation in accordance with the stage of the cattle production cycle. Meat produced from sheep in many instances is a joint product with wool and thus the statistical measurement of efficiency also is complicated for this species.

However, it was assumed that, in general, the over-all rates of gain in efficiency (output in relation to input) for hog and cattle meat would continue and the projections were made on this basis. It should be stated in qualification that there is some question as to the relative changes in efficiency which may be realized in future in the hog and cattle (meat) production enterprises. Judging from changes in the prices of hogs and cattle in more recent years, the efficiency of hog production has gained relative to that of beef production. For the longer run projections, however, it was assumed that there would be no substantial change in the relative competitive position of these two enterprises.

The projections of the effects of technological change on egg and poultry-meat production have been made on somewhat less firm statistical grounds. The comparability within the statistical series for these products has been affected by changes in the methods of collecting and compiling data. New, revised and improved series for these items date back only to 1946, and, hence, there is perhaps less certainty in the projected trends for these than for other livestock products. In general, the main species of poultry, chickens and turkeys are now being produced at much lower weights for meat purposes, but with a much more efficient utilization of feed. The trends in average meat yield per bird were projected for five to ten years and then were arbitrarily levelled.

The statistical basis for measurement of Canadian rates of egg production has not been entirely consistent. A trend line was fitted to egg yield data for the 1945-55 period and compared with the trend in egg yields for the United States. The direction and the slope (representing the increase in rate of lay) of the two trend lines were similar. The rate of increase was projected to continue but at a modified rate, rising to 250 eggs per laying hen per year by 1980.

Milk yields per cow for Canada were compared with similar information for the United States. The Canadian yields, while below those of the United States, were increasing at about the same rate from 1935 to 1955. The projection for Canada to 1980 represents an extrapolation of the 1935-to-1955 trend line.

The assessment of over-all efficiency of the livestock and poultry enterprises in relation to feed inputs and the projection of future feed requirements was undertaken by comparing indexes of physical volume of output with changes in feed supplies. However, the longer term trends here are obscured by shorter term<sup>1</sup> disturbances of over and under-supplies of feed, especially feed grains, and by abrupt shifts in the relationship of feed prices to livestock prices.

The total feed intake in the form of fodder can be only a guess since a very high proportion is derived from pasturing livestock. The quantities and qualities of feed obtained from pasture are highly variable from area to area and year to year. However, in view of the proven technical feasibility of increased output through improvement in quality of grain and fodder feeds, in methods of feeding and in utilization of feed by the animal, it was assumed that moderate gains along these lines might be expected in the future.

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<sup>1</sup> In this instance, shorter term may mean up to five or six years.

## *Appendix D*

### *Chapter 8*

#### **QUEBEC**

The tables in this appendix are reproduced from the brief presented to the Commission by *L'Union Catholique des Cultivateurs*. Not all the tables in the brief are included here, and those that have been included are numbered consecutively. The tabulations are generally descriptive of agriculture in Quebec. Those tables which provide comparisons between Quebec, Ontario and the Prairies may be of particular interest to some. Some excerpts from the brief, with revised table references and with section titles and paragraph numbers corresponding to those in the brief, are also included. The appendix may be regarded as a supplement to Chapter 8.

Table D1

# LAND AREA, CLASSIFIED AS AGRICULTURAL, FORESTED OR UNPRODUCTIVE (circa)

(square miles)

Description Agricultural land (present and potential)	Quebec	Ontario	Prairies	Canada
Occupied . . . . .	26,229	32,625	193,521	271,941
Unoccupied . . . . .	38,393	67,889	128,655	280,777
Non-forested . . . . .	18,550	32,504	226,265	306,218
Forested . . . . .	46,072	68,010	95,911	246,507
Total . . . . .	64,622	100,514	322,176	552,725
Forested land . . . . .	366,466	223,212	334,307	1,320,321
Productive land . . . . .	385,016	255,716	560,572	1,626,539
Unproductive land . . . . .	138,844	92,425	128,133	1,950,624
Total, Land Area . . . . .	523,860	348,141	688,705	3,577,163

(percentages)

Agricultural land				
Occupied . . . . .	5.0	9.4	28.0	7.6
Unoccupied . . . . .	7.3	19.5	18.6	7.8
Non-forested . . . . .	3.5	9.4	32.8	8.6
Forested . . . . .	8.8	19.5	13.9	6.8
Total . . . . .	12.3	28.9	46.8	15.4
Forested land . . . . .	69.9	64.7	48.5	36.9
Productive land . . . . .	73.5	73.4	81.4	45.4
Unproductive land . . . . .	26.5	26.6	18.6	54.6
Total, land area . . . . .	100.0	100.0	100.0	100.0

SOURCE: *The Canada Year Book*, 1954, p. 20 for the figures; the calculations are ours.



Table D2

### APPROXIMATE AREA OF NATURAL REGIONS AND OF AGRICULTURAL LAND IN THE PROVINCE OF QUEBEC

(millions of acres)

Natural regions	Total	Arable	Occupied	Suitable for colonization
Laurentian Plateau....	307.0	12-15	3-	9-12
The Appalachians.....	15.0	8-9	6-7	1-
The St. Lawrence Lowlands.....	12.8	11-12	9-10	1-2
Total.....	355.0	31-36	18-20	11-15
Percentage.....	100.0	10.0	6.0	4.0

SOURCE: *Statistical Year Book of the Province of Quebec*, 1953, p. 298.

Table D3

### PERCENTAGE OF THE LAND OCCUPIED AND FARMED BY THE OWNER

	Quebec	Ontario	Prairies	Canada
1901.....	93.2	85.1	92.2	90.7
1911.....	95.0	86.6	87.9	89.8
1921.....	96.5	88.7	83.6	85.4
1931.....	95.2	87.0	70.6	77.0
1941.....	95.2	85.0	63.2	70.3
1951.....	96.9	89.2	69.7	74.5

SOURCE: *Census of Canada, 1951, Table I, volume VI, parts I and II.*

Table D4

### ABSOLUTE AND RELATIVE IMPORTANCE OF POPULATION LIVING ON FARMS

	Quebec	Ontario	Prairies	Canada
1931				
Total population.....	2,874,662	3,431,683	2,353,529	10,376,786
Farm population.....	777,017	800,960	1,195,414	3,289,140
Percentage living on farms.....	27.0	23.3	50.8	31.7
1941				
Total population.....	3,331,882	3,787,655	2,421,905	11,506,655
Farm population.....	838,861	704,420	1,148,240	3,152,449
Percentage living on farms.....	25.2	18.6	47.5	27.4
1951				
Total population.....	4,055,681	4,597,542	2,548,770	14,009,429
Farm population.....	792,756	702,778	963,928	2,911,996
Percentage living on farms.....	19.5	15.3	38.8	20.8

SOURCE: *Census of Canada, 1951, Table I, volume VI, Parts I and II.*

Table D5

DISTRIBUTION OF FARM LABOUR FORCE AS A PERCENTAGE OF  
TOTAL LABOUR FORCE

	Quebec	Ontario	Prairies	Canada
1901.....	38.2	40.6	60.2	40.2
1911.....	31.3	31.0	50.9	34.3
1921.....	28.1	26.4	52.7	32.8
1931.....	22.5	22.7	48.6	28.8
1941 <sup>a</sup> .....	20.8	17.8	46.0	24.9
1951.....	13.3	10.7	35.2	15.6

<sup>a</sup> Including active service.

SOURCE: *Occupational Trends in Canada*, Larkin and Allen, study No. 4, service de documentation économique, [School for Higher Commercial Studies], Montreal: *Census of Canada, 1951*.

Table D6

TREND IN NUMBER OF FARM WORKERS  
14 YEARS OF AGE AND OVER

1931.....	227,783
1936.....	265,078
1941.....	254,383
1946.....	239,573
1951.....	195,410
1956.....	171,375

SOURCE: Quebec farm censuses, 1941 and 1951; "intercensal years", estimates by Dr. E. C. Hope, The Canadian Federation of Agriculture.

Table used in the brief from *l'Union Catholique des Cultivateurs* and *La Coopérative Fédérée de Québec* to the Committee on the Protection of Farmers and Consumers, p. 100.

Table D7

FARM WORKERS COMPARED WITH NON-AGRICULTURAL  
WORKERS

Census years	No. of agricultural workers	No. of non- agricultural workers	Percentage of Col. 1 to Col. 2
1931.....	227,783	794,381	28.6
1941.....	244,383	933,072	27.2
1951.....	195,410	1,276,450	15.3

SOURCE: *Ibid*, p. 100.

Table D8

## VALUE OF LAND AND BUILDINGS, AVERAGE PER FARM, 1901-51

*(dollars)*

	Quebec	Ontario	Prairies	Canada
1901 .....	2,502	3,666	2,456	2,746
1911 .....	4,263	4,366	7,281	4,900
1921 .....	6,177	6,483	9,600	7,106
1931 .....	5,032	5,583	6,489	5,563
1941 .....	3,513	4,636	4,539	4,134
1951 .....	6,305	9,467	10,900	8,871

## VALUE OF LAND AND BUILDINGS, AVERAGE PER ACRE, 1901-51

	Quebec	Ontario	Prairies	Canada
1901 .....	24	35	9	22
1911 .....	41	42	25	31
1921 .....	49	57	29	36
1931 .....	40	47	18	25
1941 .....	30	37	12	17
1951 .....	50	68	24	32

VALUE OF FARM IMPLEMENTS AND MACHINERY, AVERAGE  
PER FARM, 1901-51

	Quebec	Ontario	Prairies	Canada
1901 .....	193	258	299	213
1911 .....	347	366	548	377
1921 .....	813	858	1,315	935
1931 .....	715	791	1,188	893
1941 .....	551	844	1,069	813
1951 .....	1,578	2,970	4,581	3,103

VALUE OF FARM IMPLEMENTS AND MACHINERY, AVERAGE  
PER ACRE, 1901-51

	Quebec	Ontario	Prairies	Canada
1901 .....	2	2	1.0	2
1911 .....	3	4	1.6	3
1921 .....	6	8	4.0	5
1931 .....	6	7	3.3	4
1941 .....	5	7	2.6	3
1951 .....	13	21	10.3	11

Table D8 (Cont'd.)

## VALUE OF LIVESTOCK, AVERAGE PER FARM 1901-51

	Quebec	Ontario	Prairies	Canada
1901.....	417	646	1,132	538
1911.....	652	1,036	1,340	925
1921.....	896	1,187	1,574	1,176
1931.....	705	900	793	746
1941.....	719	1,140	869	840
1951.....	2,534	4,558	3,355	3,226

## VALUE OF LIVESTOCK, AVERAGE PER ACRE 1901-51

	Quebec	Ontario	Prairies	Canada
1901.....	4	6	4.0	4
1911.....	6	10	4.7	6
1921.....	7	10	4.7	6
1931.....	6	8	2.6	3
1941.....	6	9	2.6	4
1951.....	20	33	7.6	12

SOURCE: *Census of Canada, 1951, Table I, volume VI, Parts I and II.*

Table D9

NET VALUE IN CURRENT DOLLARS AND IN CONSTANT DOLLARS  
OF AGRICULTURAL PRODUCTION

	Quebec	Ontario	Prairies	Canada
1939				
In millions of current dollars.....	105.3	190.3	352.4	716.5
In millions of constant dollars <sup>a</sup> .....	114.6	207.0	383.5	779.6
In constant dollars per person on the farms <sup>b</sup> .....	136.6	293.8	333.9	247.3
1945				
In millions of current dollars.....	209.8	381.0	545.3	1269.4
In millions of constant dollars <sup>a</sup> .....	112.9	205.2	293.6	683.6
In constant dollars per person on the farms <sup>b</sup> .....	134.6	291.3	255.7	216.8
1951				
In millions of current dollars.....	377.3	652.4	1446.5	2563.7
In millions of constant dollars <sup>a</sup> .....	127.1	219.8	487.4	894.1
In constant dollars per person on the farms <sup>b</sup> .....	160.3	312.7	505.6	307.0
1953				
In millions of current dollars.....	321.7	536.3	1255.4	2241.3
In millions of constant dollars <sup>a</sup> .....	128.5	314.1	489.3	893.7
In constant dollars per person on the farms <sup>b</sup> .....	162.0	304.6	507.6	306.9
Increase 1939-1953.....	18.6%	3.7%	52%	24.1%

<sup>a</sup> Corrected by the farm price index of agricultural products, *Statistical Review of Canada*, 1955 supplement, p. 61.

<sup>b</sup> Physical volume (net corrected value) divided by the number of persons on the farms according to the census nearest the year in question.



Table D10

# RELATIVE IMPORTANCE OF NET VALUE OF AGRICULTURAL PRODUCTION

(in percentage of net value of all goods<sup>a</sup>)

	Quebec	Ontario	Prairies	Canada
1935.....	13.5	15.8	58.9	22.4
1939.....	13.6	15.1	62.3	23.7
1942.....	10.9	14.3	67.8	23.7
1945.....	12.6	15.6	57.5	21.5
1949.....	11.1	13.1	55.4	20.2
1950.....	10.1	12.1	51.3	17.5
1951.....	11.3	12.4	57.1	20.3
1952.....	9.0	10.0	53.6	18.1
1953.....	8.5	9.0	45.8	15.4

<sup>a</sup> The total net value includes that of agriculture, forestry, hunting, fishing, mines, electricity or motive power, the manufacturing and construction industry.

SOURCE: *Survey of Production, 1949-1953*, D.B.S., Ottawa.

Table D11

# GROWTH IN AVERAGE AREA PER FARM, 1901-51

(acres)

	Quebec	Ontario	Prairies	Canada
1901.....	103.1	104.6	282.6	124.1
1911.....	104.3	104.5	287.2	159.7
1921.....	125.4	114.3	332.0	198.1
1931.....	127.3	118.9	362.0	223.9
1941.....	116.8	125.6	392.0	236.8
1951.....	125.0	139.2	472.1	279.3

## Change in the Total Area in Farms in Percentage of Total Area of Land

	Quebec	Ontario	Prairies	Canada
1901.....	6.6	15.1	9.6	7.2
1911.....	7.1	15.7	19.6	11.2
1921.....	3.9	9.7	19.2	10.1
1931.....	5.2	9.8	23.9	12.7
1941.....	5.4	9.6	26.2	13.5
1951.....	5.0	9.0	27.0	7.5

SOURCE: *Census of Canada, 1951*, Table I, volume VI, Parts I and II.

Table D12

## FARM HOLDINGS CLASSIFIED BY SIZE OF FARM

	Quebec	Ontario	Prairies	Canada
Total of occupied farms . . . . .	134,336	149,920	248,716	623,091
(in percentage of number of farms occupied)				
Size of occupied farm				
1 - 4 acres . . . . .	0.7	1.8	0.8	1.5
5 - 10 acres . . . . .	1.5	4.2	1.3	3.4
11- 50 acres . . . . .	9.9	13.1	2.3	9.5
51-100 acres . . . . .	36.5	31.8	2.5	19.8
101-200 acres . . . . .	37.9	33.2	22.3	27.9
201-299 acres . . . . .	8.4	7.8	5.1	6.3
300-479 acres . . . . .	4.3	6.3	29.8	15.1
480-639 acres . . . . .	0.5	1.1	14.0	6.4
640 acres and over . . . . .	0.3	0.7	21.8	10.1
Total . . . . .	100.0	100.0	100.0	100.0

SOURCE: *Census of Canada, 1951, Table 4, volume VI, Parts I and II.*

Table D13

## CASH INCOME FROM SALE OF AGRICULTURAL PRODUCTS

(dollars)

	Quebec	Ontario	Prairies	Canada
1926-29 Total (000) . . . . .	100,454	260,575	543,172	970,878
per person on farms . . . . .	129.2	325.3	454.3	295.0
1935-39 Total (000) . . . . .	82,779	198,709	285,561	624,597
per person on farms . . . . .	106.5	248.0	238.6	190.0
1943-45 Total (000) . . . . .	219,796	414,682	867,840 <sup>a</sup>	1,644,469 <sup>a</sup>
per person on farms . . . . .	262.0	517.7	778.5	521.7
1948 Total (000) . . . . .	352,153	668,352	1,212,442 <sup>a</sup>	2,449,865 <sup>a</sup>
per person on farms . . . . .	444.2	951.0	1,257.8	841.5
1952 Total (000) . . . . .	417,377	736,887	1,465,442 <sup>a</sup>	2,849,310 <sup>a</sup>
per person on farms . . . . .	526.4	1,048.5	1,519.8	978.9
1954 Total (000) . . . . .	407,947	704,544	1,044,499 <sup>a</sup>	2,377,834 <sup>a</sup>
per person on farms . . . . .	514.5	1,002.5	1,083.0	816.9
% increase 1954/1943-45 . . . . .	96.4	93.6	39.1	56.6
% increase 1954/1935-39 . . . . .	383.1	304.2	353.8	330.0

<sup>a</sup> Not including supplementary payments by the government.SOURCE: Frank Shefrin, "Farm Income, Cash and Net, 1926 to 1948"; *Quarterly Bulletin of Agricultural Statistics*, January-March, 1955, page 17.

Table D14

# DEVELOPMENT OF THE STRUCTURE OF AGRICULTURAL INCOME IN PERCENTAGE OF TOTAL CASH INCOME

	Quebec	Ontario	Prairies	Canada
Grains and fodder				
1926-29.....	10.3	14.9	79.4	49.9
1935-39.....	5.7	9.6	63.5	33.2
1948.....	1.3	6.1	60.5	32.5
1952.....	1.2	4.8	68.2	37.9
1954.....	0.9	4.3	56.5	26.3
Vegetables				
1926-29.....	10.6	7.7	0.3	4.5
1935-39.....	10.1	14.1	1.1	7.5
1948.....	5.3	14.3	0.9	6.4
1952.....	8.8	18.2	0.7	7.6
1954.....	7.2	15.1	1.6	7.0
Cattle and eggs				
1926-29.....	31.3	49.8	14.6	27.0
1935-39.....	33.8	46.3	25.9	33.5
1948.....	43.1	51.4	29.6	37.9
1952.....	41.5	50.7	21.5	33.0
1954.....	39.0	52.5	32.3	40.1
Dairy products				
1926-29.....	33.1	20.1	4.0	12.2
1935-39.....	35.5	22.3	7.0	16.9
1948.....	35.1	21.3	6.7	15.9
1952.....	34.3	18.6	4.6	14.0
1954.....	37.8	20.2	6.9	17.9
Fruit				
1926-29.....	0.8	2.6	—	1.8
1935-39.....	1.8	2.8	—	3.2
1948.....	0.9	2.1	—	1.5
1952.....	1.6	2.3	—	1.4
1954.....	2.1	3.0	—	1.9
Forest products				
1926-29.....	9.6	1.9	0.1	2.0
1935-39.....	7.8	1.5	0.4	2.3
1948.....	10.3	1.9	0.1	2.6
1952.....	11.3	2.2	0.9	3.0
1954.....	11.3	2.0	1.0	3.2

SOURCE: Frank Shefrin, "Farm Income, Cash and Net, 1926 to 1948"; *Quarterly Bulletin of Agricultural Statistics*, January-March, 1955, p. 17.

Table D15

OCCUPIED FARMS, CLASSIFIED BY ECONOMIC CLASSIFICATION  
AND VALUE OF PRODUCTS SOLD IN 1950

	Quebec	Ontario	Prairies	Canada
Number of farms covered by census . . . . .	134,336	149,920	248,716	623,091
Economic categories				
Commercial farms (No.) . . . . .	88,758	119,247	217,276	470,207
% of total . . . . .	66.1	79.5	87.4	74.5
Value of products sold:				
\$20,000 and over . . . . .	175	1,922	1,863	4,409
\$10,000 to \$19,999 . . . . .	1,091	6,452	8,061	16,834
\$ 5,000 to \$ 9,999 . . . . .	7,917	23,574	33,262	69,019
\$ 2,500 to \$ 4,999 . . . . .	25,998	41,129	67,653	144,828
\$ 1,200 to \$ 2,499 . . . . .	35,407	32,742	67,237	151,290
\$ 250 to \$ 1,199 . . . . .	18,170	13,428	39,200	83,827
Small-scale Farms Less than \$250 (No.) . . . . .	24,187	17,172	18,402	87,057
% of total . . . . .	18.0	11.4	7.4	14.0
Part-time farms (No.) . . . . .	21,189	13,364	12,765	65,135
% of total . . . . .	15.8	8.9	5.1	10.4
Institutional farms (No.) . . . . .	202	137	273	692

SOURCE: *Census of Canada, 1951*, Table 25, volume VI, Parts I and II.

Table D16

WAGE EARNERS IN AGRICULTURE AND THE PHYSICAL VOLUME  
OF AGRICULTURAL PRODUCTION, PROVINCE OF QUEBEC

Year	Agricultural workers		Agricultural production	
	Number	Index	Production index	Index of per capita volume
		(1935-39 = 100)		(1935-39 = 100)
1935 . . . . .	257,619	94.55	93.6	99.0
1936 . . . . .	265,078	97.3	99.3	102.0
1937 . . . . .	272,537	100.0	97.6	97.3
1938 . . . . .	279,996	102.7	97.6	85.2
1939 . . . . .	287,453	105.5	111.9	106.1
1940 . . . . .	270,918	99.4	111.8	112.5
1941 . . . . .	254,383	93.3	108.2	116.0
1942 . . . . .	236,576	86.8	121.7	140.2
1943 . . . . .	231,488	84.9	112.3	132.2
1944 . . . . .	234,150	85.9	131.1	152.6
1945 . . . . .	236,812	86.9	100.7	115.9
1946 . . . . .	239,573	87.9	112.2	127.6
1947 . . . . .	200,686	73.6	102.6	139.4
1948 . . . . .	215,537	79.1	121.6	153.7
1949 . . . . .	209,089	76.7	126.4	164.8
1950 . . . . .	209,089	76.7	136.3	177.7
1951 . . . . .	195,410	71.7	129.0	193.9
1952 . . . . .	158,248	61.7	124.2	201.3
1953 . . . . .	162,776	59.7	131.6	220.4
1954 . . . . .	171,375	62.9	—	—



Table D17

**NET ACTUAL AGRICULTURAL INCOME PER FARM AND  
PER FARM WORKER, PROVINCE OF QUEBEC, FIVE-YEAR PERIODS  
(1941-51)**

Year	Number of farms	Net actual Income (\$000)	Net actual Income per Farm	Number of farm Workers	Net actual Income per Farm Worker
1941 .....	155,000	90,694	\$ 580	254,383	\$360
1946 .....	145,000	155,462	930	239,573	650
1951 .....	134,000	169,668	1,260	195,410	870

SOURCE: Brief of l'Union Catholique des Cultivateurs and La Coopérative Fédérée de Québec to the Committee for Protection of Farmers and Consumers, Tables XVI and XIX.

Table D18

**NET PRODUCTION PER UNIT OF AGRICULTURAL AND  
NON-AGRICULTURAL WORK BY REGION IN CANADA, 1945-53  
(dollars)**

Year	Maritimes	Quebec	Ontario	Prairies	B. C.	Canada
<b>Agricultural division</b>						
1945 .....	533	458	945	1,128	1,638	864
1946 .....	475	536	947	1,012	1,670	843
1947 .....	562	545	981	1,379	1,370	1,016
1948 .....	667	776	1,302	1,507	1,372	1,206
1949 .....	699	804	1,365	1,452	1,480	1,219
1950 .....	716	767	1,482	1,660	1,719	1,311
1951 .....	1,055	1,088	1,850	2,544	1,833	1,885
1952 .....	1,156	983	1,478	2,697	2,000	1,843
1953 .....	892	957	1,316	2,144	2,091	1,556
Percentage increase 1945-53 .....	166.7	208.9	139.2	190.0	127.6	180.0
<b>Non-agricultural division</b>						
1945 .....	1,636	1,857	2,251	1,894	2,095	2,017
1946 .....	1,540	1,821	2,192	1,995	2,016	1,984
1947 .....	1,647	2,022	2,352	2,130	2,134	2,147
1948 .....	1,766	2,157	2,636	2,531	2,545	2,400
1949 .....	1,742	2,204	2,726	2,688	2,586	2,561
1950 .....	1,875	2,331	2,871	2,976	2,803	2,625
1951 .....	1,923	2,516	3,097	2,933	3,223	2,809
1952 .....	2,191	2,714	3,364	3,113	3,450	3,047
1953 .....	2,311	2,843	3,570	3,419	3,708	3,249
Percentage increase 1945-53 .....	141.2	153.1	158.5	180.5	176.9	161.1

Table D19

# PRODUCTIVITY INDEX PER UNIT OF AGRICULTURAL AND NON-AGRICULTURAL WORK BY REGION IN CANADA, 1945-53

Year	Maritimes	Quebec	Ontario	Prairies	B. C.	Canada
<b>Agricultural division</b>						
1945.....	62	53	109	131	190	100
1946.....	56	64	112	120	198	100
1947.....	55	54	97	136	135	100
1948.....	55	64	108	125	114	100
1949.....	57	66	112	119	121	100
1950.....	55	59	113	127	131	100
1951.....	56	58	98	135	97	100
1952.....	63	53	80	146	109	100
1953.....	57	62	85	138	134	100
<b>Non-agricultural division</b>						
1945.....	81	92	112	94	104	100
1946.....	78	92	110	101	102	100
1947.....	77	94	110	99	99	100
1948.....	74	90	110	105	106	100
1949.....	71	90	111	109	105	100
1950.....	71	89	109	113	107	100
1951.....	68	90	110	104	115	100
1952.....	72	89	110	102	113	100
1953.....	71	88	110	105	114	100

SOURCE: W. J. Anderson, "Productivity of Labour in Canadian Agriculture", *The Canadian Journal of Economics and Political Science*, May, 1955, pp. 235 and 236.

## EXCERPT 1 — THE CULTIVABLE AREA.

25. The area of the farms and the amount of cleared land in relation to the total area is directly proportionate to the natural regions of the province. Now, three physiographical areas can be distinguished in the province of Quebec.

26. The Laurentian Plateau contains the greater part (84.5%) of the lands of Quebec or almost all the part situated north of the St. Lawrence Valley, starting from an imaginary line joining Hull and Quebec, following the north shore of the St. Lawrence as far as the Strait of Belle Isle. The cultivable area does not exceed 15 million acres and the cultivated land covers about 3 million acres (Table D2).

27. The Appalachian Region extends to the southwestern part of the province from the United States boundary to the eastern tip of Gaspé. Three-fifths of this region is arable, or about 9 million acres, of which 80% is already occupied. Agriculture in this area is distinctly diversified.

28. The region of the St. Lawrence Lowlands is the vital part, the garden of the province. It extends along both sides of the St. Lawrence, between the Laurentians and the Appalachians, from the Ontario border and the State of New York to Matane County inclusive. It is 80 miles wide between Lachute and Granby and only 30 miles at the latitude of Quebec; it tapers off as it goes down stream. The greater part, from 85% to 95%, is arable and already 90% of that area is occupied by farms. The activity of that agricultural region is definitely commercial. Situated in that region are 25% of the farms, which account for 50% of the volume of production for the province. The agricultural enterprises of this section are characterized by their diversity. Specialized crops, market gardening, the dairy industry, apple-growing, poultry-farming, tobacco-growing, sugar-beet-growing, etc., all play a prominent part.

## EXCERPT 2 — SOME CONTRASTS BETWEEN AGRICULTURE IN QUEBEC AND ON THE PRAIRIES

62. The topography of the Prairies does not present three distinct geological regions as does Quebec, but three rather extensive and related parts. This great plain, with only 19.2% of the total area of Canada, contains 58.3% of all agricultural land, compared with 30% for the central provinces — 11.7% for Quebec and 18.3% for Ontario.

63. The peculiarities of the physical setting are reflected in the direction taken by the agricultural economy. Thus in the Prairies, a large proportion of the population still lives on the farms: 964,000 out of 2,549,000 or 38.8% in comparison with 15.3% for Ontario and 19.5% for Quebec (Table D4). Therefore, one out of three workers is engaged in agriculture in the west of the country, while only one out of ten is so employed in the central provinces. If the trend of strictly agricultural occupations is downwards everywhere, it is less noticeably so in the West than in Ontario and Quebec (Table D5). The farmers are also a little younger on the Prairies than in the central provinces, which also has a notable repercussion on the number of years on the farm.

64. As for the market, the central provinces have 9,434,000 consumers right at hand, whereas the Prairies have only 2,745,000 persons and must seek outlets in the other provinces and especially in other countries.

65. The Prairies are the home of the extensive farming, while the central provinces have a more diversified farming on farms which are four times smaller on the average. In the West 21.8% of the occupied farms have more than 640 acres, while farms of that extent represent only 0.3% in Quebec and 0.7% in Ontario. The trend towards larger farms is less marked in the latter provinces than in the Prairies (Tables D11 and D12)

where the value of agricultural equipment and machinery has increased tenfold in fifty years.

66. The value of agricultural production in the Prairies, which exceeds 50% of that for all agricultural regions of the country, has also shown the greatest increase, in spite of the vicissitudes of the wheat market: the increase in constant dollars is 52% in 1953 in relation to 1939, compared with 18.6% for Quebec and 3.7% for Ontario (Table D9). It is not surprising that the cash income from the sale of agricultural products is higher in the Prairies, namely \$1,083 per person on the farms compared with \$1,002 for Ontario and \$514.50 for Quebec (Table D13). If the agricultural cash income per person on the farm in 1954 is compared with that of 1943-45 and in 1935-39, it will be found that the increase was slightly higher in the central provinces than in the Prairies (Table D13).

67. Conditions of equilibrium of agricultural income are also quite different, according to which of the two great centres is being considered. Grains and fodder, which do not form 1% of the agricultural income in Quebec and form less than 5% in Ontario, account for nearly 60% in the Prairies. Meat production as a source of income is important everywhere, although preponderant in the central provinces and especially in Ontario. Dairy products constitute one of the largest sources of agricultural income in Quebec. The preliminary estimates of the cash income from Canadian agriculture for 1955 established the fact that last year dairy products represented 37.7% of the total income of Quebec agriculture, 19.4% of the total agricultural income of Ontario, while they accounted for only 17.5% of the total incomes of the three Prairie provinces. Receipts from the sales of vegetables, fruit and forest products are considerable in the central provinces and slight on the Prairies. In short, the agricultural economy of the Prairies still rests on two large categories of income, whereas it is based on a much greater diversity in Quebec and Ontario (Table D14).

68. The problems peculiar to each region are many and will have to be more and more the basis of government measures to be adopted 25 years from now.

### EXCERPT 3 — EFFICIENCY AND PRODUCTIVITY IN AGRICULTURE

74. An over-all approximation of the efficiency of agriculture can be obtained in several ways, particularly by the evaluation

- (a) of the volume of production per agricultural worker;
- (b) of the average net income per farm and of the actual income per agricultural worker.



75. If we compare the physical volume of agricultural production in the Province of Quebec with the number of active workers on the farm, according to the data in Table D16, we find that the per capita output doubled between 1935 and 1953. We had already noted in Table D9 that the per capita production on the farms had increased from \$136.60 to \$162 between 1939 and 1953, an increase of 18.6%. So it can be said that five men now do the work done by ten only 15 years ago. There are several factors behind this increased efficiency on Quebec farms and throughout Canada; in particular, better use is made of family labour, more widespread use is made of mechanization and of certain improvements in production techniques.

76. It goes without saying that we are only dealing here with averages and that actual cases may fall short of them or exceed them. In other words, efficiency has not been achieved to an equal degree on all farms. To be convinced of this, one has only to consult the data on Table D15 where it will be seen that the province had 24,000 subsistence farms or 18% of the total (against 11.4% in Ontario and 7.4% in the Prairies), 21,000 part-time farms or 15.8% of the total (against 8.9% in Ontario and 5.1% in the Prairies) and 54,000 farms where the value of products sold did not exceed \$2,500. This situation is especially significant of the low output of a large portion of Quebec farms since the year 1951 was especially favourable from the point of view of the general level of farm incomes. It is very doubtful that there was any marked increase in efficiency on those farms during the period considered. If we accept those figures, we will find that the tendency towards improved efficiency in Quebec agriculture has been pronounced on about only 40,000 farms in the whole Province of Quebec, or about 30% of the total. And yet the fact remains that a minimum output should become general in proportion to the investments made by the farmers.

77. Another yardstick of the efficiency of work done on the farms is provided for us by the analysis of incomes. As is seen in Table D17, the net agricultural income per farm and per worker more than doubled from 1941 to 1951, which is another indication of increased efficiency on a number of farms. If we no longer take into account agricultural workers only, but all persons on farms as is mentioned in Table D13, we would observe that the cash income from the sale of agricultural products increased from \$106 per capita in 1935 to \$514.50 in 1954, an increase of 383% in current dollars. As the agricultural products price index rose from 88.0 (1935-39 = 100) in 1935 to 233.4 in 1954, an actual rise can be seen here more pronounced even than that in Ontario and on the Prairies where the level of income is nevertheless twice as high per person.

78. In order to gain a more accurate idea still of agricultural productivity, we could refer to a systematic study made of it by W. J. Anderson, from which we will reproduce certain important conclusions in Tables D18 and D19. According to that data, the net production per unit of work on the farms has increased from \$458 in 1945 to \$957 in 1953, compared with \$864 and \$1556 for all of Canada.

79. Although all the other provinces, except the Maritimes, have a much higher per capita level of production than Quebec, it is in Quebec that the increase has been most noticeable in the last eight years; it is 209.0 (1945 = 100) compared with 139.2 for Ontario and 190.0 for the Prairies. If the index of agricultural productivity per worker for all Canada is established at 100.0, Quebec has an index of 62%, Ontario 85%, the Prairie Provinces 138%, British Columbia 134% (Table D19).

80. These tables enable us also to compare productivity in the field of agriculture with that in the non-agricultural field. Thus, in Quebec in 1953, when the production per working unit was \$957, production in the non-agricultural sector was \$2,843, nearly three times as high. If the first sector is compared with the second, we obtain the table below in which the figures are expressed as a percentage.

#### PRODUCTIVITY PER UNIT OF AGRICULTURAL WORK COMPARED TO PRODUCTIVITY PER UNIT OF NON-AGRICULTURAL WORK

*(percentage of the agricultural sector compared to the non-agricultural sector)*

Year	Maritimes	Quebec	Ontario	The Prairies	British Columbia	Canada
1945.....	0.33	1.25	0.42	0.60	0.78	0.43
1946.....	0.31	0.29	0.43	0.51	0.83	0.42
1947.....	0.34	0.27	0.42	0.65	0.64	0.47
1948.....	0.38	0.36	0.49	0.60	0.54	0.50
1949.....	0.40	0.36	0.50	0.54	0.57	0.49
1950.....	0.38	0.33	0.52	0.56	0.61	0.49
1951.....	0.55	0.43	0.60	0.87	0.57	0.68
1952.....	0.53	0.36	0.44	0.87	0.58	0.60
1953.....	0.39	0.34	0.37	0.63	0.56	0.58
Situation in %						
1953/1945.....	118.1	136.0	88.1	105.0	71.8	111.6

SOURCE: W. J. Anderson, "Productivity of Labour in Canadian Agriculture", *The Canadian Journal of Economics and Political Science*, May, 1955, p. 235.

## *Appendix E*

### *Chapter 13*

#### **FARM INCOMES**

##### *Gross and Net Farm Income Statistical Series*

Details of the official federal government farm income statistical series for the years to 1950 were obtained from D.B.S. Reference Paper No. 25, Part II, "Handbook of Agricultural Statistics" issued in February, 1952. This paper includes definitions and a statement of the methods used in preparing income estimates. Data for the years since 1950 and revisions to earlier estimates were obtained from the *Quarterly Bulletin of Agricultural Statistics*, from special bureau farm income releases, and from official work sheets.

As suggested in the text of the chapter, the estimates of gross and net incomes generally have an acceptable degree of accuracy and of spatial and temporal reliability. They are built upon statistics of production, disposition and prices. While there are ranges in the quality among the various product series used, the over-all totals are considered to be satisfactory for most purposes. These observations also apply to the series of items comprised in farm operating expenses.

An awareness of the possible sources of statistical departures in the various components is desirable, but it is not intended that this should be interpreted to the point of invalidating the broader conclusions to be drawn from the present farm income statistical series. At the same time, it is desirable to avert any suggestion of absolute authenticity or correctness of the magnitude of the income levels or differences in income levels as presented in the chapter.

##### *Claimants of Net Farm Income and Composition of the Farm Labour Force (Table 77)*

The total employed farm labour force in the year 1955 averaged 818,000, all categories, as recorded by D.B.S. labour force surveys.

The labour force survey enumeration employs a system of relatively rigid definition and classification within which the determination of the agricultural labour force meets conditions applied to other components of the national labour force.

However, for certain types of analyses, it is necessary that each farm be identified with an entrepreneur or manager. Under definitions of the labour force survey, a considerable number of farm operators (both land owners and tenants) are counted in other occupations. The data presented in Table 77, therefore, reconcile the labour force survey statistics pertaining to paid and non-paid farm help with estimates of the total number of farm operators (other than hired farm managers). The number of operators has been based upon projections of the trend in number of farms to 1955.

Those farm operators who may be classified in occupations other than farming by the labour force survey at the same time hypothetically have claims to a share in net farm income. This is because, by virtue of ownership or tenancy, they have certain entrepreneurial functions which, if rewarded, represent a claim upon net farm income.

This point is explained to avoid confusion and uncertainty with the official figure of 818,000 representing the Canadian farm labour force for 1955. The total claimants shown in Table 77 of Chapter 13 are some 46,000 higher. This difference represents approximately the average number of farm entrepreneurs counted in other occupations during the labour force surveys of that year.

### ***Net Farm Income and Net National Income***

The statistics given in Table 78 do not represent the contribution of agriculture to national income. This table represents a comparison of "net farm income" as defined in Chapter 13 with net Canadian national income less the "net farm income". When agricultural income is incorporated as a component of net national income, the farm income series is subjected to a number of adjustments. There are described in D.B.S., Reference Paper No. 25, Part II, *Farm Income*, pages 1 and 2.

"With some adjustments, these estimates of farm net income are included in estimates of National Income. National Income is the sum of the nation's earnings from the production of goods and services. The modifications made by the National Income Section, Dominion Bureau of Statistics, include deductions for the estimated income from incorporated farms, the imputed net rent of owner-occupied farm houses and payments made under the provisions of the Prairie Farm Income plan and the Prairie Farm Assistance Act. In addition, there are adjustments for undistributed earnings of the Canadian Co-operative Wheat Producers and the Canadian Wheat Board. Corporation profits in agriculture and imputed net rent of owner-occupied farm homes are deducted for purposes of National



Income estimates, as they are included with the investment income sector of the National Accounts. Similarly payments under the provisions of the Prairie Farm Income plan and Prairie Farm Assistance Act are considered as transfer payments and excluded from National Income since they are not payments for productive services. As National Income estimates purport to measure earnings out of current production rather than receipts of income, it is necessary to adjust Farm Net Income figures to have them measure income accruing to farm operators from farm production rather than income received. Accordingly an adjustment, consisting of two parts, is made. The first part takes account of the undistributed earnings of Canadian Co-operative Wheat Producers and the Canadian Wheat Board. The second part of the adjustment allows for the fact that current earnings of these agencies are calculated on the basis of the change in book values of inventories, whereas the required valuation of inventories for the National Accounts is the value of the physical change..."

### *Definition of a Farm and Numbers of Farms*

The definition of a farm for the 1951 census was altered appreciably from that used in 1941 and 1931. The Bureau of Statistics published a table giving the data on number of farms in 1941 adjusted to the 1951 definition. For this study a revision of the 1931 census count of farms was effected to bring it into line with the revised 1941 count and the official figure for 1951.

The estimates for intercensal years are straight-line interpolations of the adjusted or accepted census year data. For the Prairie Provinces, the quinquennial censuses of 1936 and 1946 gave additional benchmarks for the interpolation.

To the extent that changes in number of farms may have occurred at varying rates over periods of time, and within shorter periods, and to the extent that the changes in numbers may have differed directionally from the intercensal trend, the straight-line interpolation fails to reflect actual year to year changes in the count of farms. However, averages derived in this study, such as gross and net income per farm, would not be affected by such deviations to a degree likely to alter the general conclusions.

An analysis of changes in numbers of farms by provinces, however, indicates that, for various reasons, the count of farms in 1941 may be high. (This is after adjustment of 1941 numbers to 1951 definition.) The changes by provinces in numbers of farms from 1931 to 1941 show considerable variation. In the Prairie Provinces the availability of 1936 and 1946 census counts reduces the probable extent of intercensal deviation, but in eastern Canada and British Columbia, the intercensal deviations from trend may be significant. For example, in Quebec the number of farms rose from about 127,400 in 1931 to 144,900 in 1941, in contrast to a decline in the Maritimes from 77,100 to 59,100 and in Ontario

from 180,200 to 167,200. The increase in Quebec may be explained in part by the emphasis on colonization and development of new farming areas, although there is also evidence that abandonment in these areas offset in considerable part the rate of increase in new farms.

### ***The Economic Classification of Farms, 1951 Census<sup>1</sup>***

This classification takes into account (1) the total value of farm products sold; (2) the number of days the farm operator worked off the farm at either farm or non-farm work; and (3) the relationship of the value of farm products sold to income received by the operator from all other sources, reported for the calendar year 1950.

All farms (except "Institutional farms, etc.") with a total value of farm products sold of \$1,200 or more are classified as "Commercial farms". Farms reporting sales of farm products of between \$250 and \$1,199 are also included in this group if the farm operator (1) worked off the farm less than 100 days and (2) reported the value of farm sales greater than income received from other sources.

"Part-time farms" include those with sales of farm products between \$250 and \$1,199 and (1) the operator reported that he worked 100 days or more off the farm in 1950; or (2) the operator reported the farm income less than his income from other sources.

If the value of farm products sold was less than \$250 the farm is classified as a "small scale farm".

Experimental farms, community pastures, Indian reserves and farms operated by institutions are classified as "Institutional farms, etc."

### ***Statistics of Farm Capital, Tables 87, 88 and 89***

The development of statistical series on farm capital in Canada, including the construction of a farm balance statement for the whole of Canadian agriculture is still in its early stages. Although there are historical series for certain items, the variation in methods used and the concepts applied in establishing these hinder comparisons over time.

Generally, capital assets are valued in terms of current dollars with allowance for depreciation and obsolescence. The total value of farm lands and buildings, established from data of the decennial and quinquennial censuses, is estimated for intercensal years according to changes in the reported values of farm lands and buildings per acre. These values, reported by crop correspondents, appear to lag behind changes in prices at which farms currently are being sold. On this account the current capital value statistical series for farm lands and buildings probably understates the dollar value of capital stock in periods when the general level of farm prices is rising (and especially during periods of sharp

increases in the level of these prices) and overstates capital stock in real estate when farm prices are falling. Further, the degree of over and understatement in land and building values varies between agricultural areas and between provinces.

Implements and machinery values are obtained in the regular censuses. Intercensal year estimates are obtained through a deduction for depreciation offset by the addition of new investment.

Data on capital in the form of livestock represent the total inventory of livestock. Because market values for most kinds of livestock are well established and known, their capital values have a considerable measure of reality and reliability.

In the livestock component of total capital, a proportion might be considered to be operating rather than fixed capital. This refers, of course, to the young animals in the processes of growth and fattening. The capital stock as designated for the analysis in Chapter 13 falls short of a *total* capital by the omission of a number of inventory items such as seed, feed, grain held for sale, cash assets of the farm and so forth. However, the total values of land and buildings, implements and machinery and livestock comprise the bulk of the total capital stock on farms at a given date each year.

### ***An Evaluation of the Accuracy and Reliability of Census Farm Income Data***

In the analysis of the static or near static (point-of-time) farm income situation, 1951 census data on gross receipts from sales of products (gross revenue) were employed for approximating the pattern of distribution of farm incomes and for determining the effect of scale of operations upon net income.

An important consideration here is the relative accuracy of income data from census sources. In the following evaluation, the question of coverage (that is, the completeness of the enumeration) and of sampling error (where sampling was employed) are put aside. Rather, interest is centred upon reporting bias in the totals. This, of course, arises mainly in the biases accumulated in the census reports for each farm.

Reporting bias on the part of individuals consists of two types:

- (a) Unintentional bias, mostly due to inability to recall events occurring over a period of time. This includes failure to recall the quantities of product sold, or the prices realized or the total receipts obtained from sales. There is a tendency to neglect or forget pertinent incidental or trivial sales, receipts, or items of expenditure which individually may be insignificant but which in total over a period of a year may be quite important. The

cumulative results of lapses of this nature are referred to as memory bias.

- (b) Intentional bias — more or less deliberate under — or over-statement which may arise for a variety of reasons. In some instances bias of this kind may be induced by taxation programmes, while in other instances it may arise from fears, prejudice and pride. The taxation aspect is the most important cause of this type of bias and it results in a serious under-reporting of statistics of both income and assets.

Only a small amount of investigation of the degree and extent of bias in agricultural census data has been carried out in Canada. There are various ways and means of undertaking research of this nature.

One approximation of the extent of the bearing of bias in reporting can be obtained by comparing certain income data of the 1951 census with current income statistics. In the 1951 census information was obtained on Farm Revenues, these being defined as:

"Farm revenues represent the value of sales of all farm products sold from the farm including products traded or exchanged, whether received by the farm operator or some other person. Products of an institutional farm used by the institution were considered sold.

"Crop insurance and government payments received in 1950 for hail damage, crop failure, etc., were reported as crop sales. Crop participation payments received in 1950 were similarly reported."

While there are minor differences between this definition and that of Cash Receipts from the Sale of Farm Products as a component of the Net Farm Income Series, the two series may be considered comparable for the purposes at hand.

The comparisons of the data for 1940 and 1950 are detailed in Table E 1.

As noted there are sources of minor differences between the data being compared. For example, the annual series on cash farm receipts is based, for the most part, upon a reconciliation of the total production and disposition data for all the major farm commodities. Thus it is an almost complete statement of all farm product sales. On the other hand, the census data represent Farm Revenues from production on and sales off census-defined farms. The quantities missing represent production elsewhere than on farms and might amount to between 1% or 2% of the aggregate.

The implications from the comparisons shown in Table E 1, therefore, are that, for all Canada, the census reported cash receipts from sales of farm products to the extent of 90.2% and 78.1% for the years



Table E1

COMPARISON OF RECEIPTS FROM SALES OF FARM PRODUCTS PLUS CERTAIN SUPPLEMENTARY CASH INCOME, CENSUSES OF 1941 AND 1951 AND APPROXIMATE CORRESPONDING DATA FROM CURRENT FARM INCOME SERIES<sup>a</sup>

Province	(year 1940)		Difference:	
	Time Series			
	Census gross farm revenues (thousand dollars)	Cash receipts plus supplementary payments (thousand dollars)	Time series minus census (thousand dollars)	Census as percentage of time series
P.E.I.....	6,080	7,157	1,077	85.0
N.S.....	13,375	14,645	1,270	91.3
N.B.....	13,100	16,019	2,919	81.8
Que.....	93,874	112,792	18,918	83.2
Ont.....	191,750	215,936	24,186	88.8
Man.....	59,978	64,575	4,597	92.9
Sask.....	143,359	156,813	13,454	91.4
Alta.....	125,457	126,525	1,068	99.2
B.C.....	25,021	30,237	5,216	82.7
Canada.....	671,995	744,699	72,704	90.2

(year 1950)				
P.E.I.....	17,923	21,619	3,696	82.9
N.S.....	29,078	37,981	8,903	76.6
N.B.....	31,335	43,655	12,320	71.8
Que.....	255,347	355,685	100,338	71.8
Ont.....	539,954	679,757	139,803	79.4
Man.....	163,817	197,577	33,760	82.9
Sask.....	331,982	420,682	88,700	78.9
Alta.....	300,920	368,714	67,794	81.6
B.C.....	69,060	101,362	32,302	68.1
Canada.....	1,739,416	2,227,032	487,616	78.1

<sup>a</sup> Data collected in the census year on receipts apply to the previous calendar year. The comparison made, therefore, is with the current farm income receipts for the same years, namely 1940 and 1950.

1940 and 1950 respectively.<sup>1</sup> An assessment of the reliability of census data on farm income carried out in the United States<sup>2</sup> substantiates these findings in some measure. This assessment indicated that cash farm receipts were reported to the extent of only 72% of the total, production expenses to 91% of the total and net cash farm income to only 49% of the total.

<sup>1</sup> A further analysis of the source of bias carried out by D.B.S. indicates that a substantial part of the understatement of income occurred in livestock, especially hogs.

<sup>2</sup> "Measuring the Incomes of Farm People", Ernest W. Grove and Nathan M. Koffsky, *Journal of Farm Economics*, Vol. XXXI, Number 4, Part 2, November, 1949.

Further, the United States assessment disclosed that the major part of the income missing in the census total belonged to the higher income groups. The missing amount and its location in the income class distribution was such as to affect significantly the income distribution pattern and to increase the skewness.

As an aside, and to offset any implication that under-reporting of income is unique to the farm community, the article cited in the previous reference states that:

"... the under-reporting is usually the greatest in the case of the self-employed, whether farm or non-farm. ...non-farm entrepreneurial income was under-reported by about the same proportion as farm income".<sup>3</sup>

Because there has been only limited appraisal of Canadian income data, no adjustments of official data were attempted, with one exception, off-farm earnings. This adjustment is described later. However, in lieu of correcting adjustments, qualifying comment is offered as appropriate.

#### *Distribution of Farms According to Scale of Operations* *Tables 90, 91, 92 and 93*

First, the proportionately greater under-reporting of gross receipts from sales on the larger scale farms may mean that in Tables 90, 91 and 92 the numbers of full-scale farms and the percentages that full-scale farms are of the total are somewhat low. Also the percentage of total product sales originating on full-scale farms probably is understated, and by a fairly substantial dollar sum. Table E 1 shows that there was a census under-reporting bias of about \$488 million in 1950, or approximately 22%. If it is assumed, as shown in the United States assessment referred to, that nearly all of this occurred on the full-scale farms, then, instead of receipts from sales on these accounting for 93.3% as shown in Table 91, the proportion might be as high as 96% or 97%. This would leave part-time and small-scale farms representing about 38% of all farms and accounting for only 3% or 4% of total sales instead of 6.7%.

Table 93 was derived from the official statistics of net farm income by provinces, (averages of the years 1951 to 1955) and from data in Tables 90 and 91. It was assumed that on small-scale, part-time and institutional farms, gross cash receipts would be just offset by operating expenses and depreciation. In other words these farms, in total, just barely obtain a return of costs. Whether the assumption is correct is not material, since even an allowance for a moderate net return on small-scale farms would not alter to any significant degree the comparative net incomes derived for full-scale farms.

In a re-arrangement of 1951 census data to produce the statistics included in Tables 90 through 93, only farms with gross sales of \$1,200 and over were considered to fall within the full-scale category. The decision to exclude farms with sales of from \$250 to \$1,199 (although the census had defined these as Commercial) was based upon the conclusion that these hardly afforded an acceptable scale of living to the operators and their families. If, on the average, farm cash operating expenses run about one-half cash farm receipts, (see Table 94) then obviously farms with sales of \$250 to \$1,199 would have net cash incomes of only \$125 to \$600.

It is granted, however, that the upper figure of the range, \$600, might in fact be a relatively favourable net cash income from farming in certain agricultural regions. Because the problem here is being analysed in national rather than in regional terms, the application of a common total dollar standard is warranted. Deviations for regional income standards and levels of living would complicate the analysis and require establishment of a number of arbitrary standards to be applied for each region.

### *Statistics of Off-Farm Earnings Table 96*

In constructing this table, income data from the 1941 census were adjusted for understatement. It was assumed that the degree of understatement of gross receipts from sales of farm products for 1940 as shown in Table E 1 would apply also to the census data on off-farm earnings. Both receipts from sales and off-farm earnings were adjusted upward before calculation of the percentage relationship.

### *Incomes of Non-Paid Farm Workers and Labour Income of Non-Farm Workers<sup>4</sup> Table 97*

The data and methods used in arriving at the comparisons shown are described as follows:

- (a) Net farm income — in current dollars as officially published.
- (b) Off-farm labour earnings — as reported in the 1941 census for 1940 and adjusted for understatement to provide an estimate of dollar amount for 1940. The 1950 level was established in a series of steps:
  - (i) Total days worked off-farm by farm operators was computed for 1950.
  - (ii) Total days worked off-farm by farm operators was computed for 1940 and adjusted for the change in the census definition of a farm.

<sup>4</sup> For a recent study of definitions and concepts involved in this subject see "The Comparison of Agricultural and Non-agricultural Incomes, the Report of the First Canadian Agricultural Economics Society Workshop, June 18 to 22, 1956".

- (iii) Using (i) and (ii) above the volume of off-farm work was interpolated for intercensal years 1941 to 1949 and projected by extrapolation from 1951 to 1955.
- (iv) Off-farm labour earnings were then calculated by applying an annual index of the average weekly industrial composite earnings<sup>5</sup> to an index of volume of off-farm work (derived from (iii)). This was then anchored upon the adjusted off-farm earnings data from the 1941 census. Off-farm earnings for 1935 to 1939 were derived from the 1940 estimate, in relation to changes in an index of total non-farm labour earnings for the same years.
- (c) Total labour income of non-farm workers was established by subtracting from the official total annual labour income series<sup>6</sup> that portion of labour income received by paid farm workers, including a value for farm board and lodging.
- (d) The current dollar net farm income and off-farm earnings series described above were adjusted to 1949 dollars as follows:
  - (i) The farm-produced food component of net farm income, the values for which are imputed on the basis of prices received by farmers, was deflated by the official index numbers of these prices.
  - (ii) The remaining portion was deflated by index numbers of cost of goods and services used in farm family living.
- (e) The aggregates of labour income of non-farm workers were adjusted to 1949 dollars by official Consumer Price Index Numbers.<sup>7</sup>
- (f) Estimates of numbers in the non-paid farm labour force (operators of farms and non-paid farm workers) were calculated as follows:
  - (i) Benchmarks for 1941 and 1951 were established from agricultural and occupational census data for those years.
  - (ii) A benchmark for 1931 was derived by relating the farm population and farm labour statistics of the 1931 census to similar data for 1941.
  - (iii) These benchmarks were estimates of the farm labour force as at June 1. They were adjusted to an average annual figure on the basis of relationships of the June or near June figure to annual averages as reported in the Labour Force Survey.

<sup>5</sup> *Canadian Statistical Review*, 1955 Supplement, D.B.S. Table 9.

<sup>6</sup> *Ibid.*, Table 8.

<sup>7</sup> *Ibid.*, Table 17.



- (iv) Finally, intercensal year estimates and estimates for 1951 to 1955 were interpolated and extrapolated relative to changes in the total agricultural labour force data.<sup>s</sup>
- (g) The number of farms was obtained by the procedure outlined in a previous reference in this appendix. (See "Definition of a Farm and Numbers of Farms".)
- (h) The numbers in the non-agricultural labour force were obtained by subtracting from official estimates of numbers of employed paid workers,<sup>o</sup> estimates of the numbers of paid agricultural workers.

### *Wages of Paid Male Farm Help Table 99*

The changes which have occurred in farm wage rates as between contract monthly and annual rates for the years in which the series are available are given in Table E 2.

Table E2

### WAGES OF PAID MALE FARM HELP,<sup>a</sup> MONTHLY AND ANNUAL CONTRACT RATES COMPARED, 1940 AND 1941 AND 1953 TO 1955

	Monthly contract		Annual contract	
	Per month <sup>b</sup>	Annual rate <sup>c</sup>	Monthly rate <sup>d</sup>	Per year
	\$	\$	\$	\$
1940.....	24.87	298.44	38.00	456.00
1941.....	30.46	365.52	46.58	559.00
1953.....	99.67	1,196.04	88.33	1,060.00
1954.....	98.67	1,184.04	89.58	1,075.00
1955.....	97.00	1,164.00	84.58	1,015.00

a Board and lodging included. Reported in current dollars.

b Average of wages reported at Jan. 15, May 15 and Aug. 15 each year.

c Monthly rate multiplied by 12.

d Rate per year divided by 12.

The farm wage rates in Table 99 were adjusted to 1949 constant dollars by deflating with index numbers of the costs of goods and services used by farm families.

### *Farm Net Worth (Partial)*

Data available on assets and liabilities per farm are brought together in Table E 3.

Table E3

Year	Partial capital stock <sup>a</sup>	Liabilities <sup>b</sup>	Partial net worth
1951.....	15,106	1,664	13,442
1952.....	15,367	1,802	13,565
1953.....	16,158	1,943	14,215
1954.....	16,158	2,051	14,107
1955.....	16,853	2,224	14,629

a Land and buildings, implements and machinery and livestock only.

b Total debt as estimated in Table 61, Chapter 6 divided by estimated number of farms.

<sup>s</sup> *Ibid.*, Table 7.

<sup>o</sup> *Ibid.*, Table 7.

*Farm Income and Related Statistics—Inadequacies, Gaps and Needs*

Throughout Chapter 13, and in this appendix, the qualifications, the comment and the manipulation and adjustment of existing data have indicated the statistical deficiencies and difficulties in carrying out an analysis of the Canadian farm income situation. It is not the intention to reflect upon or criticize a relatively small group of economists and statisticians who have been responsible for the development, maintenance and improvement of farm income statistics. Rather, it is the hope that, by noting some of the areas of difficulty and by making suggestions, certain guiding principles may be established for the continuance, improvement and expansion of work in this field. Some steps have already been taken in these directions and plans have been made for further work. The following remarks and suggestions are made, however, to support the present and future efforts. Basic to improvement of the income time series is the development and improvement of the primary data on production, disposition and prices of farm commodities. This is a continuous process, fraught with innumerable difficulties, especially for commodities in which production or marketing or both processes are scattered and unorganized. There is a particular need for better assessment of "the income-in-kind component". This might be achieved through a programme of special sampling surveys designed to determine rates of consumption for home-produced commodities by areas and to establish changes in these rates over time. A similar method might be used to provide better information on certain categories of inputs (farm expenses), especially where satisfactory ancillary industry data are not now available, either in terms of physical volume or value.

However, opportunity for a substantial contribution to adequate and useful information about farm incomes lies within the census and sampling sectors of activity. Recognizing limitations such as the length of schedule and many other problems, full advantage might be taken of sampling procedures to:

- (a) Expand upon detail of inputs, especially physical quantities, to provide a good benchmark for intercensal estimates.
- (b) Obtain more precise data on income from products difficult to assess in the current statistical reporting programme and on income from off-farm sources.
- (c) Obtain check statistics for, where feasible, the purpose of assessing bias and either making this information available or correcting for bias before release of census information.

One of the major handicaps to the use of census and other data for historical analysis is the too frequent interruption of a statistical series by reason of changes in definition, concepts and so forth, or at times the complete elimination of a series. These take place without provision

for a linkage or splicing from the old to the new. In several instances the income analysis was made more difficult or adversely affected on this account. While the problems of collecting income data are acknowledged, and while the particular difficulties of income inquiries are appreciated, these considerations must be reconciled with the increasing demand from the public for measurement and comparisons of money incomes.

Further, these demands are increasing in respect to the detail required and also in respect to the subsequent type of analysis, especially of income distribution according to a wide range of criteria. Public authorities need information of this kind for an understanding of area and regional problems and for wise administration of resource use programmes.

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<sup>1</sup> This is one of a series of three studies on Canadian international economic relations prepared under the direction of S. S. Reisman.















